VOL. 17 • NO. 05
MAY 2010

MSMR

A publication of the Armed Forces Health Surveillance Center

MEDICAL SURVEILLANCE MONTHLY REPORT

IN THIS ISSUE:

Read the MSMR online at: http://www.afhsc.mil

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE **MAY 2010**	2. REPORT TYPE	3. DATES COVERED **00-00-2010 to 00-00-2010**

4. TITLE AND SUBTITLE **Medical Surveillance Monthly Report Vol 17, No 05**	5a. CONTRACT NUMBER
	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **U.S. Army Center for Health Promotion and Preventive Medicine,Arnold Forces Health Surveillance Center,Silver Spring,MD,20910**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**28**	

Temporal Characteristics of Motor Vehicle-related Fatalities, U.S. Armed Forces, 1998-2009

In the United States, motor vehicle-related fatalities significantly vary in relation to months of the year (highest rates are in July and August, lowest in January and February), days of the week (highest on Saturdays, intermediate on Fridays and Sundays, lowest on Mondays through Thursdays), and certain holidays and long weekends (e.g., highest on 2-4 July, 23-24 December, 1 January, and Labor Day weekend).[1,2] Although these trends are well described among the U.S. population as a whole, it is unclear if the U.S. military population displays similar temporal characteristics of motor vehicle-related fatalities.

In the U.S. military since 1998, motor vehicle accidents have caused nearly one-quarter of all deaths of active duty service members. In recognition of this toll, military commanders routinely disseminate messages that encourage safety -- particularly while driving -- prior to major holidays. It is not clear, however, that motor vehicle fatality risks in military populations have the same temporal relationships to holiday periods as in non-military populations. Most federal holidays are observed on Mondays and Fridays to provide longer holiday periods — and in turn, more opportunities for long distance and recreational driving. In the military, a day preceding or following a long holiday weekend is often designated a "training holiday," i.e., compensatory time for military duties (e.g., field training exercises) conducted during nights, weekends, and other holidays. As a result, during holiday weekends, the days of peak travel of military members may differ from those of their civilian counterparts.

The increased operational tempo of the U.S. military since the beginning of combat operations in Iraq and Afghanistan also affects the amount and timing of motor vehicle travel and risk. For example, since 2003, many U.S. military members have been deployed to Iraq or Afghanistan or have been at sea during U.S. national holidays and usual summer vacation periods. Also, many military members take extended post-deployment leaves soon after they return from lengthy combat-related deployments. As a result, in U.S. military compared to civilian populations, motor vehicle use and associated risks may be less concentrated around federal holiday and summer vacation periods.

Figure 1. Motor vehicle-related fatalities among individuals in active service, by day of the year, U.S. Armed Forces, 1998-2009

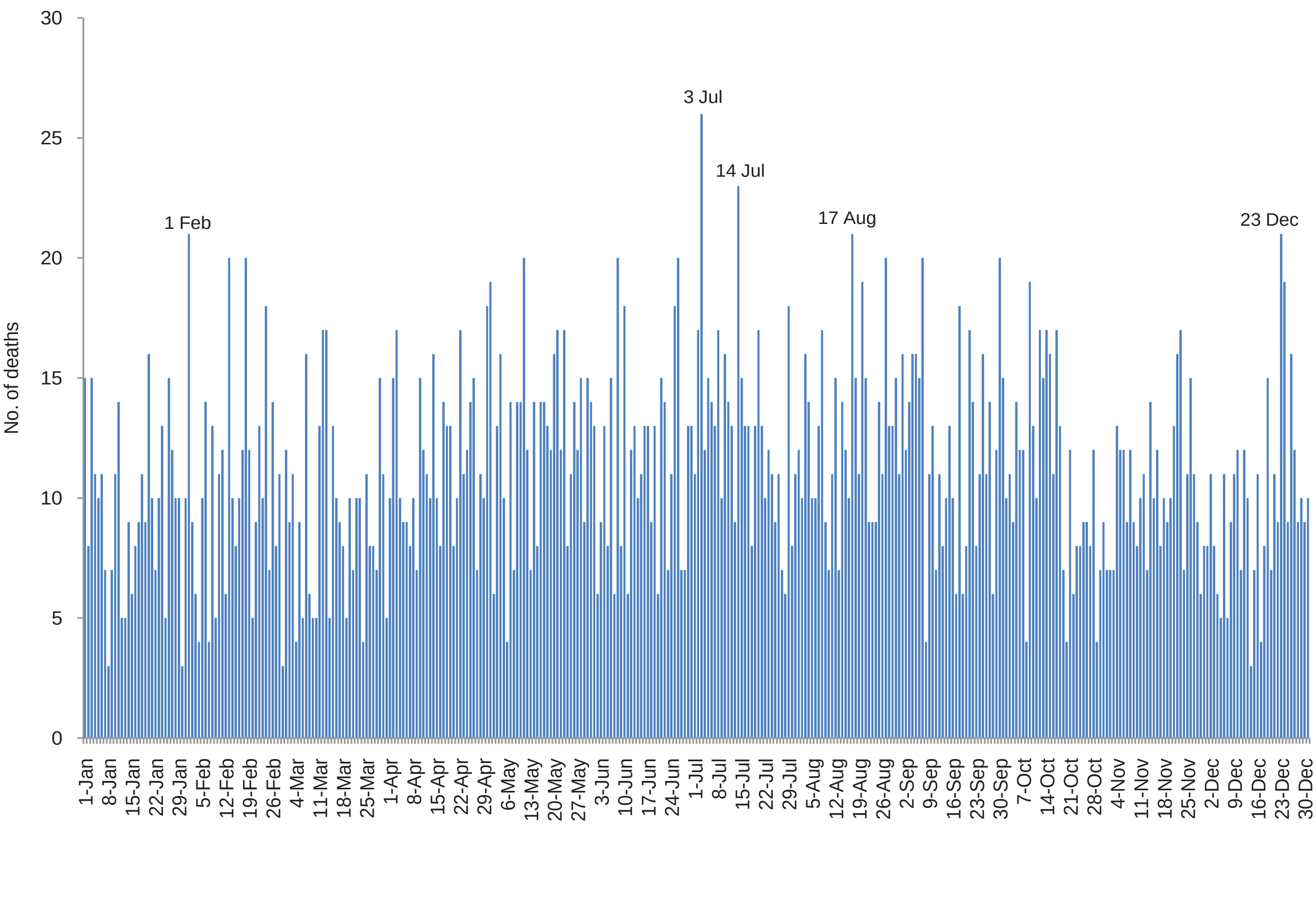
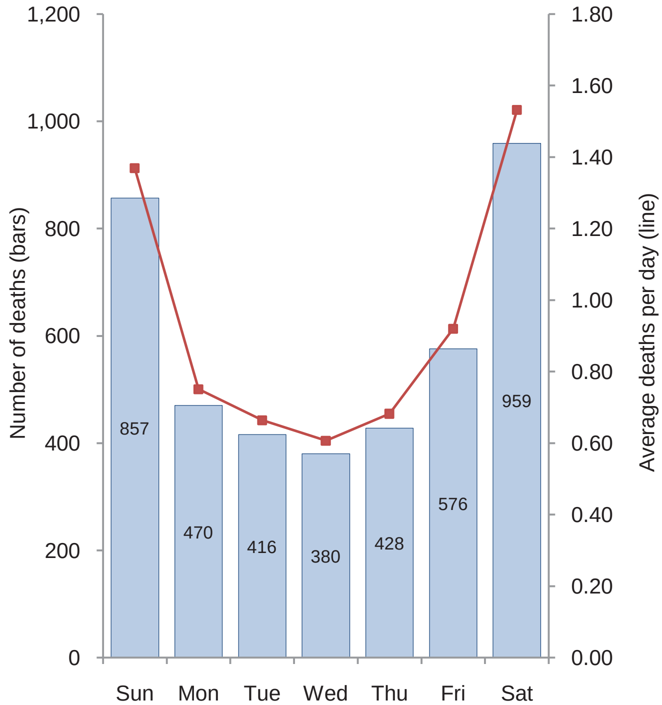


Figure 2. Motor vehicle-related deaths by day of the week, U.S. Armed Forces, 1998-2009



Combat veterans may be predisposed to participate in risky activities (e.g., driving motorcycles or automobiles at unsafe speeds, without indicated protective equipment, under the influence of alcohol),[3,4] particularly soon after they return from service in Iraq or Afghanistan. Also, it is common for deployment veterans to purchase motorcycles soon after they return.[5,6] These and other factors may increase the risk of motor vehicle-related deaths during post-deployment periods.

In March 2010, the *MSMR* summarized numbers, rates, and trends of motor vehicle-related deaths during the past 12 years. This report examines temporal patterns of deaths from motor vehicle accidents among active duty members of the U.S. Armed Forces in relation to specific months, days, federal holiday periods, and periods immediately following return from deployment.

Methods:

The surveillance period was 1 January 1998 - 31 December 2009. The surveillance population included all individuals who served on active duty in the active or Reserve component of the Army, Navy, Air Force, or Marine Corps at any time during the surveillance period. Motor vehicle-related deaths while on active duty were ascertained from records maintained in the DoD Medical Mortality Registry of the Armed Forces Medical Examiner System and routinely provided to the Armed Forces Health Surveillance Center for integration into the Defense Medical Surveillance System.

For this analysis, a motor vehicle-related death was defined by a mortality registry record with an "underlying cause of death" code corresponding to a collision or non-collision motor vehicle accident.[5] Motor vehicle deaths that were considered "intentional" (i.e., suicide, homicide, war-related) were excluded.

For surveillance purposes, "federal holiday periods" included the weekend days that were proximate to the respective holidays. For example, when a holiday was observed on a Monday or Friday, the respective holiday period included the adjacent Saturday and Sunday; when a holiday occurred on a Tuesday, the holiday period included the preceding Saturday, Sunday, and Monday; when a holiday occurred on a Thursday, the holiday period included the subsequent Friday, Saturday, and Sunday; and so on. As a result, all holiday periods were three or four days long, except

Table 1. Motor vehicle accident (MVA) fatalitites while on active duty, by month, U.S. Armed Forces, 1998-2009

	Active and reserve components	Active component	
	No.	No.	Rate[a]
January	295	280	20.3
February	305	294	21.3
March	285	274	19.9
April	350	339	24.7
May	391	369	26.8
June	347	330	23.9
July	405	386	27.9
August	392	377	27.2
September	363	338	24.4
October	338	324	23.4
November	310	297	21.5
December	305	297	21.5

[a]Death rate per 100,000 person-years

Table 2. Motorcyclist fatalitites while on active duty, by month, U.S. Armed Forces, 1998-2009

	Active and reserve components	Active component	
	No.	No.	Rate[a]
January	31	31	2.2
February	48	48	3.5
March	46	45	3.3
April	110	106	7.7
May	108	106	7.7
June	100	99	7.2
July	118	116	8.4
August	92	89	6.4
September	95	85	6.1
October	79	77	5.6
November	62	62	4.5
December	46	45	3.3

[a]Death rate per 100,000 person-years

when a holiday occurred on a Wednesday; in such cases, the holiday period was just one day. To separate holiday-related from day-of-the-week effects, motor vehicle accident-related deaths were summarized by days of the week during holiday and non-holiday periods.

Summary measures were the numbers of motor vehicle-related deaths in the surveillance population overall (i.e., active and reserve component members who died while on active duty), deaths per 100 days of a specific type (e.g., day of the week, during holiday period), and deaths per 100,000 person-years (p-yrs) of active military service. Because there are large, daily fluctuations in the numbers of individuals on active duty (e.g., training, mobilization of Reserve component members), fatality rates were summarized for the active component only.

Results:

By month:

During 1998 through 2009, 4,086 service members died from motor vehicle accidents while on active duty **(Table 1)**. In general, rates of motor vehicle accident-related deaths were fairly stable during the late fall and winter (November-March), sharply increased through the spring (April-May), and peaked in the summer. During the 12-year period, there were more motor vehicle accident-related deaths in July (n=405) and August (n=392) and fewer in March (n=285) and January (n=295) than in any other month **(Table 1)**.

Motorcyclists accounted for nearly one-fourth (23%) of all service members who died from motor vehicle accidents during the period. Deaths among motorcyclists were most frequent in July (n=118, rate: 8.5 per 100,000 p-yrs) and April (n=110, rate 8.0 per 100,000 p-yrs) **(Table 2)**. There was more variability across seasons in relation to motorcycle than other motor vehicle-related deaths. For example, there were approximately twice as many deaths of motorcyclists during the generally warmer months (April-September) than during the cooler months (October-March) **(Table 2)**; in contrast, there were only six percent more motor vehicle fatalities (unrelated to motorcycles) from April-September compared to October-March (data not shown).

Table 3. Days of the year with the most motor vehicle-related deaths, 1998-2009

Date	No.
3 July	26
14 July	23
1 February	21
17 August	21
23 December	21
13 February	20
18 February	20
11 May	20
8 June	20
26 June	20
27 August	20
7 September	20
30 September	20

Table 4. Days of the year with the most motorcycle-related deaths, 1998-2009

Date	No.
20 May	9
12 May	8
3 July	8
3 April	7
8 June	7
2 July	7
5 July	7
18 September	7

Table 5. Deaths by day of the weeks during holiday period vs. non-holiday period, U.S. Armed Forces, 1998-2009

	No. of deaths (1998-2009)	Event rate per 100 days during holiday periods	Event rate per 100 days during non-holiday periods	Rate ratio
Sunday	159	139.47	136.33	1.02
Monday	92	115.00	69.23	1.66
Tuesday	6	75.00	66.34	1.13
Wednesday	2	33.33	60.97	0.55
Thursday	14	70.00	68.20	1.03
Friday	34	100.00	91.55	1.09
Saturday	182	159.65	151.76	1.05

Table 6. Motor-vehicle related deaths during, before and after holiday periods, U.S. Armed Forces, 1998-2009

	No. of deaths (1998-2009)	Event rate per 100 days in the period	Rate ratio
Holiday periods	489	130.05	1.45
Holiday -1	134	111.67	1.24
Holiday -2	72	60.00	0.67
Holiday +1	97	80.83	0.90
Non-holiday periods	3,597	89.77	ref

By day of the year:

Over the 12-year period, there were more motor vehicle-related fatalities on 3 July (n=26), 14 July (n=23), 23 December (n=21), 17 August (n=21), and 1 February (n=21) than any other calendar day **(Table 3, Figure 1)**. Of 13 dates with 20 or more motor vehicle-related deaths, five were frequently included in holiday periods: President's Day (13 and 18 February), Independence Day (3 July), Labor Day (7 September), and Christmas (23 December). It is also of interest that 1 February (n=21) was associated with the weekend of the Super Bowl (not a federal holiday) during 5 of the 12 years in the surveillance period. Deaths of motorcyclists were most frequent on 20 May (n=9), 12 May (n=8) and 3 July (n=8) **(Table 4)**. Of note, three of the eight dates with the most motorcycle-related fatalities were clustered around Independence Day (motorcycle-related deaths by date: 2 July (n=7); 3 July (n=8); 5 July (n= 7).

By day of the week:

By far, more U.S. military members died on Saturdays (n=959) and Sundays (n=857) as a result of motor vehicle

Table 7. Among deployers to Iraq or Afghanistan, risk of motor-vehicle related fatality during the 30 days post-deployment as compared to all other non-deployed periods of service, active component, January 2002-December 2009

	Deaths among motorcyclists		Deaths among non-motorcyclists		All MVA-related deaths	
	No.	Rate[a]	No.	Rate[a]	No.	Rate[a]
During the 30 days post-deployment	15	8.09	58	31.28	73	39.36
All other non-deployed periods of service	704	7.33	1,787	18.61	2,491	25.94
Rate ratio		*1.10*		*1.68*		*1.52*

[a]Rate per 100,000 person-years of service

accidents than on any other single day of the week **(Figure 2)**. Of all motor vehicle-related deaths during the period, nearly one-quarter (23.5%) occurred on Saturdays and 44% occurred during weekends (Saturday or Sunday). There were more deaths on Fridays (n=576) and fewer on Wednesdays (n=380) than on any other weekday. Of note, motor vehicle-related deaths were 66% more likely on Mondays that were part of holiday periods compared to all other Mondays. For all other days of the week, there were only slight differences in motor vehicle-related death rates between those that were and were not part of holiday periods **(Table 5)**.

Holiday vs. non-holiday periods:

During all federal holiday periods between 1998 and 2009, there were 489 motor vehicle-related deaths of U.S. military members **(Table 6)**. Overall, the motor vehicle-related death rate was 45% higher during holiday periods (130.1 deaths per 100 holiday-associated days) than all other times (89.8 deaths per 100 non-holiday-associated days); also, the death rate was 24% higher on days that immediately preceded holiday periods (111.7 deaths per 100 days preceding holiday periods) compared to all non-holiday periods. Of note, death rates were lower two days before and one day after holiday periods compared to all other non-holiday times **(Table 6)**.

Post-deployment:

Among active component members who had deployed to Iraq or Afghanistan, motor vehicle-related fatality rates were 52% higher during the first 30 days after returning from deployment compared to all other non-deployed service time **(Table 7)**. Of note, the relatively high mortality among recently returned deployers was primarily due to non-motorcycle-related accidents; motorcycle-related death rates were comparable between the first 30 days post-deployment and all other non-deployed times **(Table 7)**.

Editorial comment:

Since 1998, among active military members, motor vehicle-related deaths have been much more frequent during summer than winter months: the majority of motor vehicle-related fatalities (and two-thirds of motorcycle-related deaths) have occurred during April through September. More service members have died on Saturdays and Sundays from motor vehicle accidents than on any single weekday. Rates of death from accidents were higher during federal holiday periods than non-holiday periods, and on days immediately preceding holiday periods compared to other non-holidays. The deadliest holiday periods tended to be the Fourth of July, Labor Day, and Christmas periods.

There were clear differences in the temporal relationships of motorcycle and non-motorcycle-related deaths; in particular, motorcycle deaths had much greater season-to-season variability. For example, among military motorcyclists, there were twice as many deaths during the spring-summer (623 deaths) as during fall-winter months (312 deaths). Motorcycle-related fatalities were most frequent in July and April, and three of the deadliest days of the year for motorcyclists clustered around Independence Day. An important finding of the report is that motor vehicle-related death rates were sharply higher during the first 30 days after service members' return from deployments; of note, however, motorcycle-related death rates were only slightly higher within the first month after redeployment compared to other times.

The findings of this report should be interpreted in light of several limitations. First, this analysis is based upon dates of deaths rather than the dates of the ultimately fatal motor vehicle accidents; deaths from accidents can occur immediately or days to months (or more) after the date of the accident. Furthermore, the National Highway Transportation Safety Administration (NHTSA) defines holiday periods as beginning at 6:00 P.M. of the evenings before holidays or holiday weekends. Because precise times of fatal accidents and deaths were not available for this analysis, holiday periods and times of deaths were summarized in relation to days. As a result, for example, deaths that occurred on days preceding holiday periods may have been misclassified for this analysis in relation to NHTSA definitions. In addition, summaries of motor vehicle-related deaths in U.S. civilian populations are generally limited to crash deaths; thus, for example, they exclude deaths related to rollovers, fires, and losses of control. In contrast, this report included all motor vehicle accident-related deaths, regardless of their natures. Because of these and other factors, direct comparisons of the numbers, natures, and timing of motor vehicle-related fatalities in U.S. civilian and military populations are problematic. Lastly, death rates were calculated using person-year denominators reflective of

the entire active component population. It was not possible to calculate rates based upon more specific estimates of the population at risk, such as vehicle miles travelled or the number of operators of motorcycles and other motor vehicles.

In spite of the limitations, the findings of this report are informative and potentially useful to public health and safety professionals, commanders and supervisors, and others concerned with the content and timing of safety messages and safety campaigns. For example, while the risk of a service member dying from a motor vehicle accident is higher on a Saturday or Sunday than on a weekday and higher during a federal holiday period than on a non-holiday, motor vehicle-related deaths occur throughout the year. In fact, more than half of all motor vehicle-related deaths of service members occur on weekdays and outside of federal holiday periods.

The finding of relatively high rates of motor vehicle-related deaths during the first month after returning from deployment is interesting and potentially important. However, more in-depth studies than are possible using routinely collected health surveillance data are necessary to define the determinants of the increased risk and to estimate the natures and strengths of their effects.

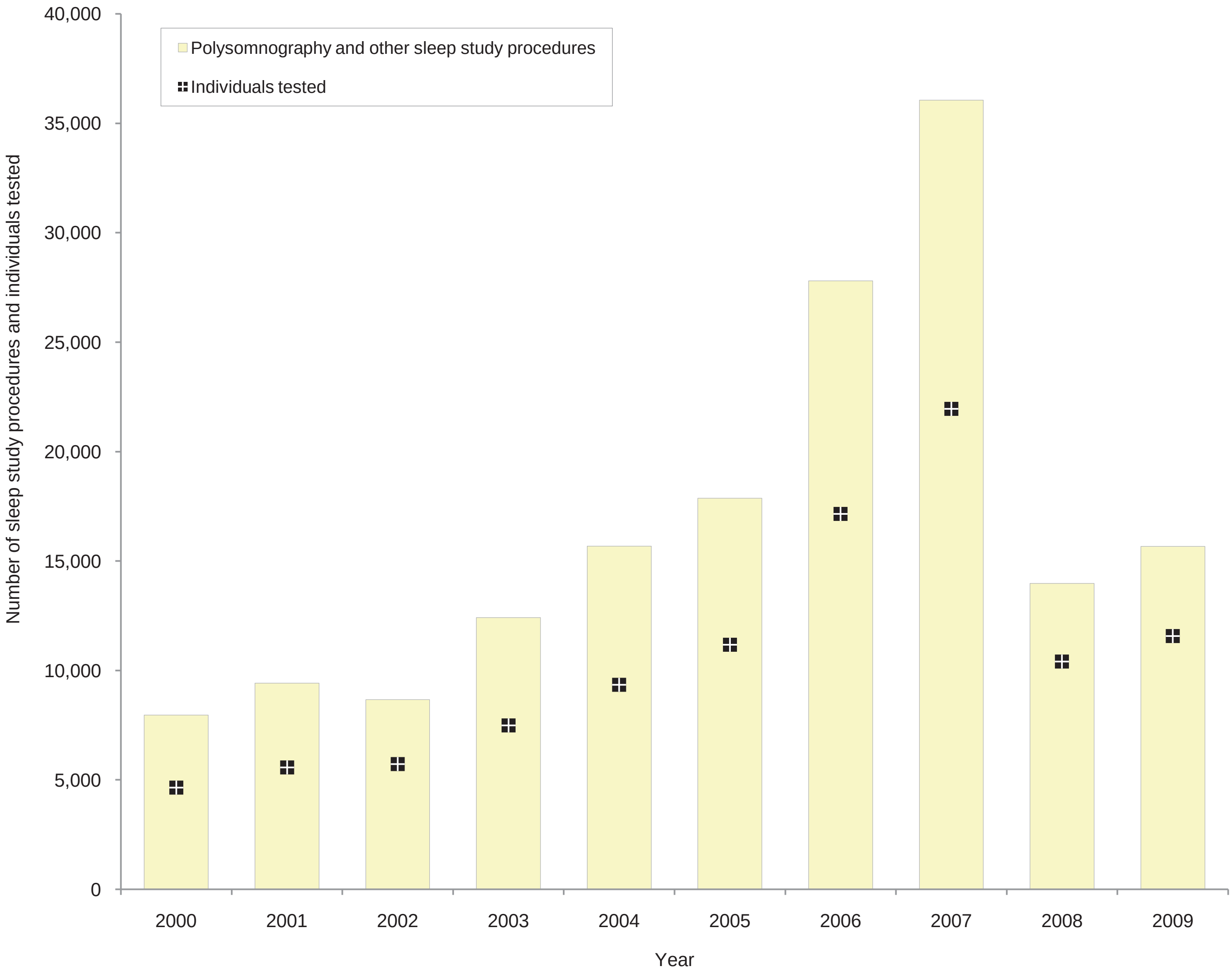
Motor vehicle safety should be a high priority that is continually emphasized throughout military chains of command. Motor vehicle safety messages should be frequent and persistent — not tied specifically to national holidays. The risk of a service member dying in a motor vehicle accident is related to many factors including vehicle type and mechanical condition, duration of travel, speed (in general and related to weather, traffic, and road conditions), timing and duration of rest, alcohol consumption, seat belt use, driver characteristics (e.g., experience, distractions, demeanor), and so on. Safety messages should provide specific and practical guidance regarding safe motor vehicle use. Senior leaders and supervisors should lead by example, modeling safe motor vehicle use for their subordinates. Finally, laws, regulations, and guidelines related to motor vehicle safety should be rigidly enforced; violations should be considered serious threats to force health.

References:

1. Farmer CM, Williams AF. Temporal factors in motor vehicle crash deaths. *Inj Prev*. 2005;11:18-23.
2. National Highway Traffic Safety Administration. National Center for Statistics and Analysis. Trend and pattern analysis of highway crash fatality by month and day. Technical Report. DOT HS 809 855. August 2005.
3. Garvey Wilson AL, Lange JL, Brundage JF, Frommelt RA. Behavioral, demographic, and prior morbidity risk factors for accidental death among men: a case-control study of soldiers. *Prev Med.* 2003 Jan;36(1):124-30.
4. Bell NS, Amoroso PJ, Williams JO, et al. Demographic, physical, and mental health factors associated with deployment of U.S. Army soldiers to the Persian Gulf. *Mil Med.* 2010 Apr;175(4):227-37.
5. Nguyen D. Off-duty military motorcycle deaths spur training at Camp Pendleton. San Diego News Network. 30 September 2009. Accessed 20 May 2010 at <http://www.sdnn.com/sandiego/2009-09-30/military/off-duty-military-motorcycle-deaths-spur-training-at-camp-pendleton>.
6. Boxley M. 1/230th soldiers pick up Harleys after year-long Iraq deployment. *The Daily Times*. 4 April 2010. Accessed 20 May 2010 at <http://www.thedailytimes.com/article/20100404/NEWS/304049969>.
7. Armed Forces Health Surveillance Center. Motor vehicle-related deaths, U.S. Armed Forces, January 1998-September 2009. *Medical Surveillance Monthly Report (MSMR)*. 2010 Mar;17(3):2-5.

Surveillance Snapshot: Sleep studies

Polysomnography and other sleep study procedures[a] and individuals tested, active component, U.S. Armed Forces, 2000-2009



[a]Polysomnograms and other sleep study procedures as indicated by inpatient and outpatient procedural codes. In March 2008, the U.S. Centers for Medicare and Medicaid Services released a statement allowing the use of portable home monitors to diagnose obstructive sleep apnea. This may or may not explain the decline in the numbers of procedures in 2008 and 2009.

Obstructive Sleep Apnea, Active Component, U.S. Armed Forces, January 2000-December 2009

Obstructive sleep apnea (OSA) is characterized by the complete or near-complete cessation of airflow during sleep due to obstruction of the upper airway. Common symptoms of OSA include snoring, choking or gasping during sleep, insomnia, morning headache, and daytime sleepiness.[1]

Risk factors for the development of OSA include obesity, increasing age, male gender, and smoking. OSA has a significant public health impact due to its co-occurrence with other health-related conditions; OSA has been linked to increased risk of motor vehicle accidents, neurocognitive impairment, and cardiovascular disease.[2,3] Prevalence estimates of OSA cluster around 2.5% for women and 4% for men.[4] An analysis of Veterans Health Administration records revealed that approximately three percent of more than four million U.S. military veterans had documented diagnoses of sleep apnea;[5] of note, the veterans included in that study were significantly older and contained proportionally more males than the current active military population.

The gold standard for diagnosing OSA is polysomnography, a study performed in a laboratory by a sleep technician. Throughout a night of sleep, physiologic parameters including airflow, respiratory effort, and oxygen saturation are continuously monitored (See Surveillance Snapshot on page 7). The severity of OSA is characterized by the apnea-hypopnea index (AHI). The AHI quantifies the number of episodes of cessation or decreased airflow during sleep, i.e., apnea (complete or partial cessation of airflow) and hypopnea (decreased airflow). Less than 5 AHI events per hour are considered normal; mild OSA is defined as 5-15 events per hour, and moderate and severe OSA are defined as 15-30 and greater than 30 events per hour, respectively.[2]

This report summarizes numbers, rates, trends, and comorbid conditions for obstructive sleep apnea among active component U.S. military members during the past ten years.

Methods:

The surveillance period was 1 January 2000 to 31 December 2009. The surveillance population included all individuals who served in the active component of the Army, Navy, Air Force, Marine Corps or Coast Guard at any time during the surveillance period.

For surveillance purposes, an incident case of obstructive sleep apnea was defined by any hospitalization with an OSA-specific diagnosis code in any diagnostic position; or by two

Figure 1. Crude (unadjusted) incidence rates of obstructive sleep apnea, by demographic and military characteristics, active component, U.S. Armed Forces, January 2000-December 2009

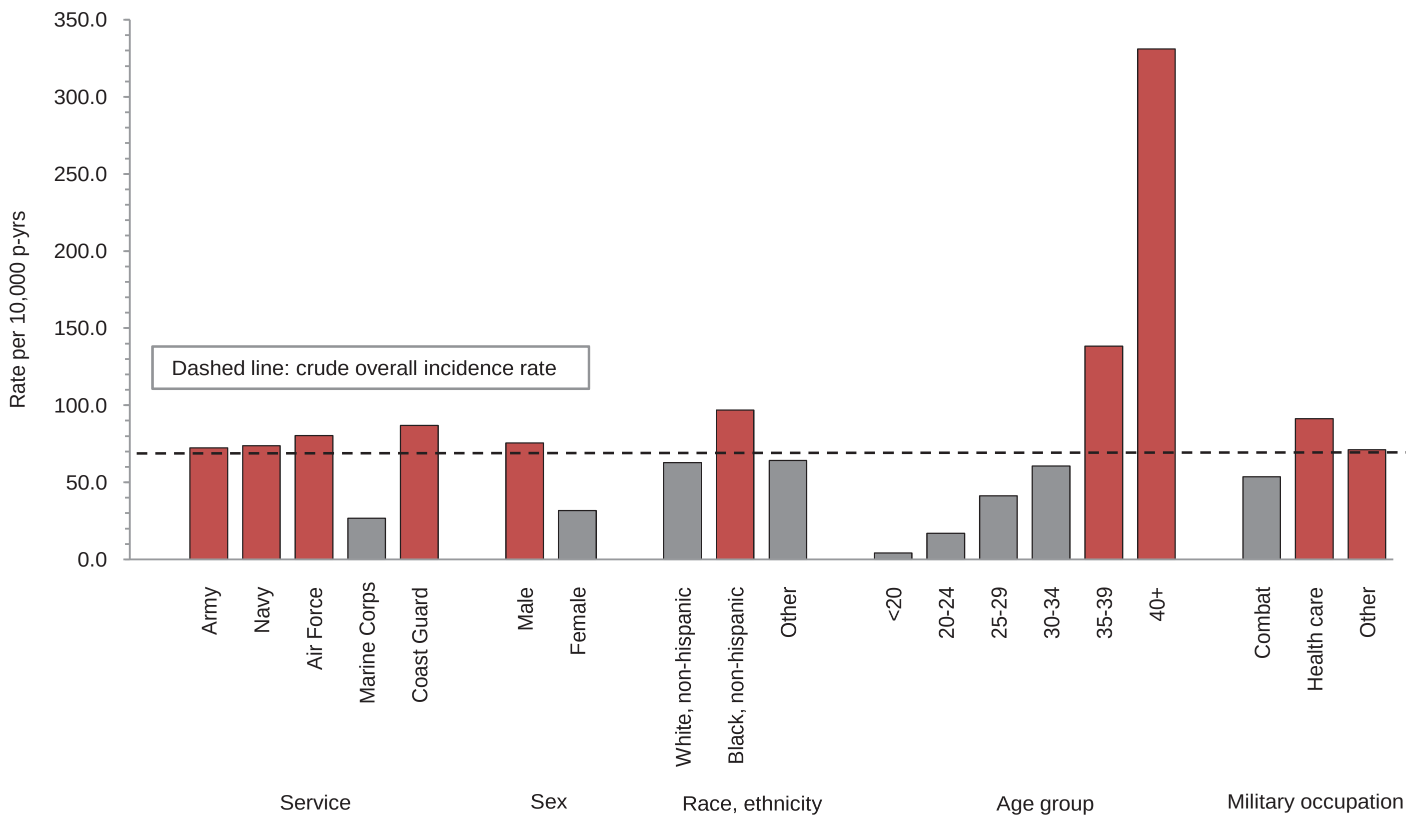


Table 1. Incident diagnoses and incidence rates of sleep apnea, active component, U.S. Armed Forces, January 2000-December 2009

	Total 2000-2009		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009	
	No.	Rate[a]	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Total	96,922	69.1	3,563	25.6	3,994	28.8	4,312	30.5	5,278	36.7	6,086	42.3	7,678	54.9	12,288	89.0	14,820	107.8	18,468	133.0	20,435	145.3
Service																						
Army	35,579	72.3	846	17.9	1,028	21.8	1,120	23.4	1,390	28.5	1,722	35.2	2,505	52.0	4,440	91.2	5,667	112.8	7,874	151.3	8,987	168.9
Navy	25,778	73.7	1,262	34.8	1,263	34.6	1,353	36.2	1,508	40.5	1,662	45.3	2,072	58.6	3,120	91.7	3,832	117.2	4,635	145.0	5,071	160.5
Air Force	27,486	80.2	1,196	34.2	1,349	39.1	1,501	42.1	1,946	53.6	2,284	61.9	2,547	73.3	3,715	110.0	4,062	124.9	4,330	137.2	4,556	143.5
Marine Corps	4,793	26.7	109	6.4	191	11.1	173	10.1	212	12.0	218	12.4	312	17.5	548	30.9	722	39.7	1,086	56.3	1,222	60.8
Coast Guard	3,286	86.8	150	43.4	163	47.1	165	45.7	222	58.7	200	52.1	242	62.6	465	119.7	537	136.9	543	136.4	599	148.1
Sex																						
Male	90,430	75.6	3,318	27.9	3,725	31.5	3,998	33.2	4,894	40.1	5,671	46.3	7,161	60.0	11,474	97.2	13,858	117.8	17,281	145.4	19,050	158.3
Female	6,492	31.6	245	12.2	269	13.1	314	14.9	384	17.9	415	19.4	517	25.3	814	40.5	962	48.4	1,187	59.5	1,385	68.2
Race/ethnicity																						
White, non-hispanic	55,803	62.9	2,234	25.4	2,521	28.8	2,732	30.6	3,322	36.7	3,708	40.8	4,376	49.5	7,085	81.0	8,220	94.0	10,202	115.2	11,403	126.9
Black, non-hispanic	24,052	96.9	734	27.0	829	30.4	937	34.5	1,185	44.4	1,459	56.7	2,098	86.8	3,109	134.6	3,839	171.4	4,727	212.1	5,135	230.2
Other	17,067	64.1	595	24.8	644	26.8	643	25.4	771	29.1	919	33.6	1,204	44.0	2,094	76.0	2,761	99.7	3,539	126.6	3,897	136.6
Age																						
<20	589	4.2	48	3.2	63	3.9	82	5.1	60	3.9	39	2.7	32	2.5	58	4.6	63	5.0	77	6.1	67	5.5
20-24	8,149	17.0	414	9.4	463	10.3	486	10.3	593	11.9	623	12.4	489	10.0	929	19.1	1,149	23.9	1,404	29.1	1,599	32.9
25-29	11,894	41.3	462	16.8	557	21.1	547	20.5	647	23.4	730	25.6	832	28.9	1,528	52.3	1,758	58.9	2,278	73.5	2,555	78.6
30-34	12,126	60.6	562	26.6	608	29.8	632	31.0	747	36.6	753	37.0	1,012	50.9	1,459	75.0	1,761	91.6	2,164	112.2	2,428	123.0
35-39	23,873	138.3	1,012	51.4	1,087	56.9	1,119	59.8	1,385	76.5	1,499	86.5	1,886	114.8	2,966	185.0	3,572	224.4	4,390	278.4	4,957	317.8
40+	40,291	331.1	1,065	89.6	1,216	102.3	1,446	117.9	1,846	148.9	2,442	192.0	3,427	271.8	5,348	437.4	6,517	547.7	8,155	689.4	8,829	736.8
Military occupation																						
Combat	15,404	53.6	505	18.0	592	21.2	573	20.4	707	24.8	836	28.7	1,171	39.4	1,876	65.1	2,385	82.3	3,259	110.8	3,500	122.1
Health care	10,403	91.2	469	41.0	475	41.4	499	43.2	604	52.0	688	59.0	849	74.6	1,405	123.9	1,591	141.7	1,839	165.2	1,984	176.8
Other	71,115	71.1	2,589	26.0	2,927	29.4	3,240	31.8	3,967	38.3	4,562	44.2	5,658	57.3	9,007	92.0	10,844	111.4	13,370	136.0	14,951	148.3

[a]Rate per 10,000 person-years

or more ambulatory visits within 90 days of each other with diagnoses indicative of OSA. Each individual was counted as a case only once per lifetime. Diagnosis codes (ICD-9-CM) considered indicative of obstructive sleep apnea were 780.51 "insomnia with diagnosed sleep apnea", 780.53 "hypersomnia with diagnosed sleep apnea", 780.57 "unspecified sleep apnea", and 327.23 "obstructive sleep apnea".

For this analysis, conditions comorbid with OSA were identified by other (non-OSA indicator) diagnoses that were reported during the same medical encounters at which incident OSA cases were ascertained. The 20 most frequent co-occurring diagnoses (excluding other sleep-related diagnoses and codes for routine medical examinations [V70.0–V70.5]) during OSA case-defining inpatient and outpatient encounters were retained for summary purposes.

Results:

Between 2000 and 2009, there were 96,922 incident diagnoses of obstructive sleep apnea among active component service members; most incident diagnoses were made in outpatient settings (data not shown). More than 40% of all incident diagnoses of OSA were among service members older than 40 **(Table 1)**.

During the 10-year period, the crude overall incident rate (IR) was 69.1 cases per 10,000 person-years (p-yrs) **(Table 1)**.

Figure 2. Incidence rates of obstructive sleep apnea, by age group, active component, U.S. Armed Forces, 2000-2009

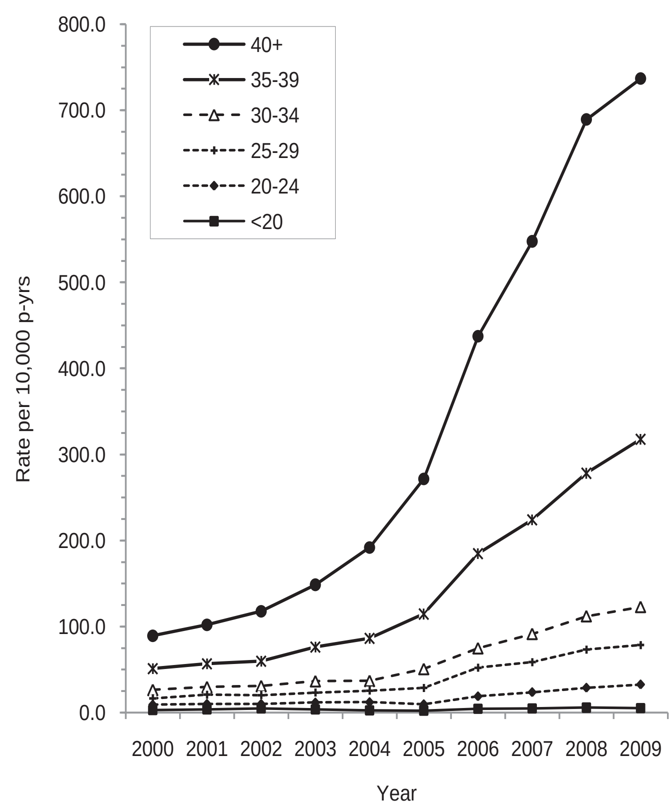
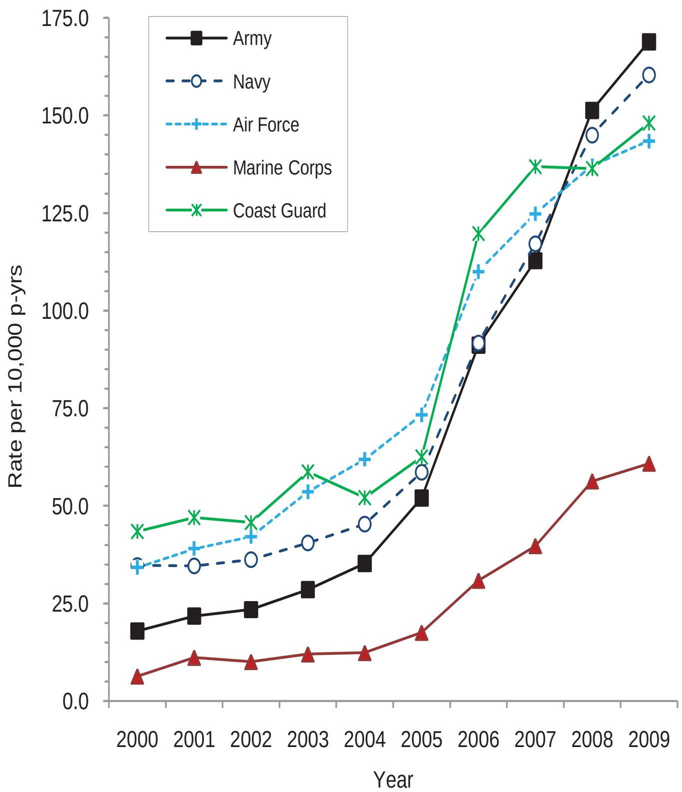


Figure 3. Annual rates of incident diagnosis of obstructive sleep apnea, by Service, active component, U.S. Armed Forces, 2000-2009



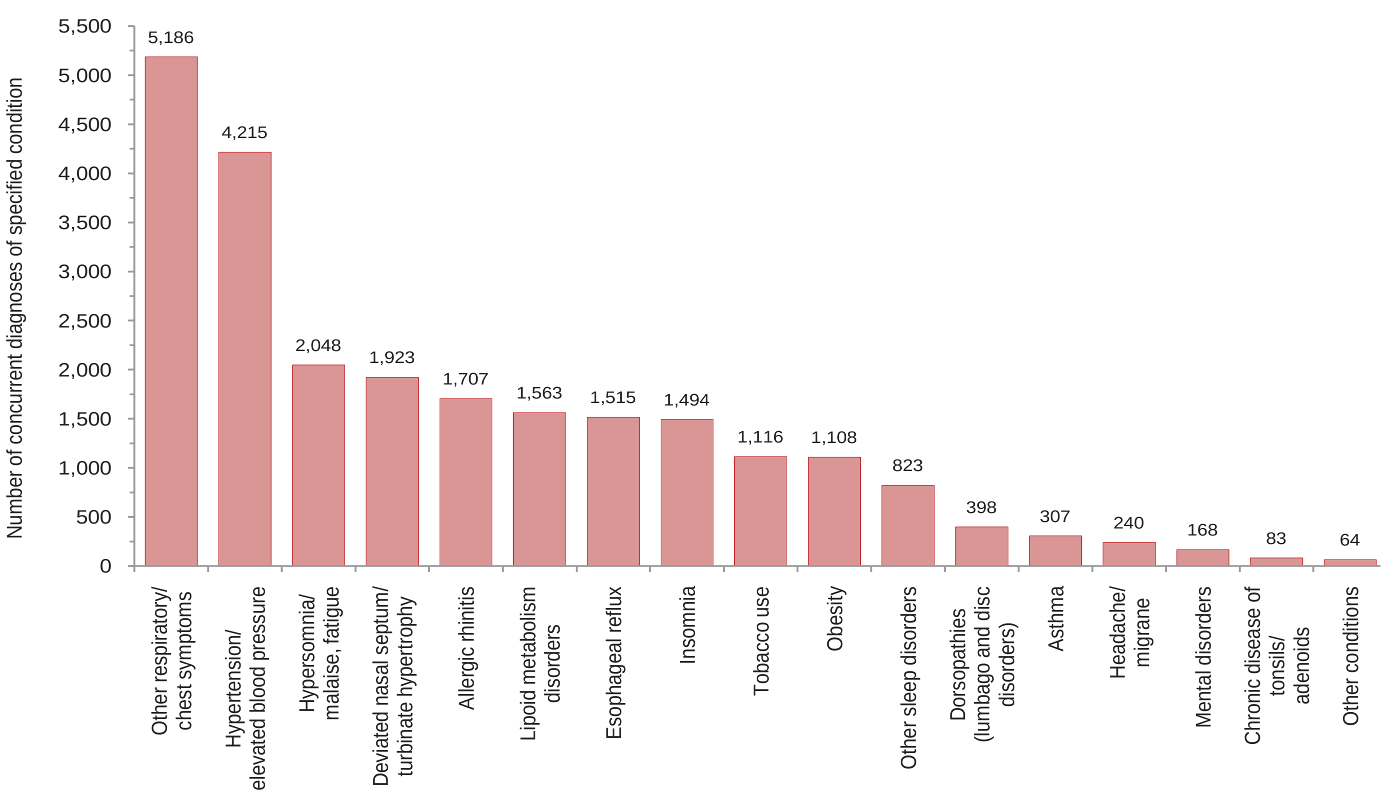
Incidence rates were highest by far among the oldest (>40 years) service members and relatively low among Marines, females, and the youngest (<30 years) service members **(Table 1, Figures 2,3)**. The relatively high rates among service members older than 40 may reflect, to some extent, diagnoses of sleep apnea during mandatory medical examinations prior to retirement.

Overall, incident diagnoses and rates increased nearly six-fold from 2000 (n=3,563; rate: 25.6 per 10,000 p-yrs) to 2009 (n=20,435; rate: 145.3 per 10,000 p-yrs). Among service members older than 40, incidence rates increased more than eight-fold during the period **(Table 1, Figure 2)**.

In each of the Services, incident diagnoses of OSA increased during the period, but the magnitudes of the increases varied across the Services. Specifically, in 2000, rates were higher in the Coast Guard, Air Force, and Navy than in the Army (intermediate) or Marine Corps (lowest); by 2009, the highest and lowest rates were in the Army and Marine Corps, respectively **(Figure 3)**.

The medical conditions most frequently diagnosed concurrently with OSA among service members include non-specific respiratory/chest symptoms; hypertension; constitutional symptoms such as excessive/inappropriate sleepiness ("hypersomnolence"), malaise, fatigue; and nasal passage obstruction (e.g., deviated nasal septum, turbinate hypertrophy) **(Figure 4)**.

Figure 4. Conditions diagnosed concurrently with obstructive sleep apnea, active component members, U.S. Armed Forces, 2000-2009



Editorial comment:

Over the past 10 years, there has been a striking six-fold increase in incident diagnoses of obstructive sleep apnea among active component members of the U.S. military. Consistent with published literature, incident rates were more than two-times higher among males than females and increased very sharply with age. During the 10-year surveillance period, rates of incident diagnoses increased more than eight-fold — to more than 7% per year — among military members older than 40.

As with any report based on records maintained in a medical administrative database, the results of this analysis should be interpreted with caution. Undoubtedly, several factors have contributed to the recent increase in diagnoses of OSA among military members. For example, the completeness and accuracy of diagnosing and reporting clinically apparent cases of OSA has likely changed over time. In the past ten years, the numbers of sleep specialty clinics and sleep diagnostic laboratories in the Military Health System have likely increased; in turn, the availability of expert assessments of sleep disorders (including OSA) among military members has also increased. If capabilities to detect and diagnose OSA cases have recently increased, higher rates of incident diagnoses of OSA may reflect increased detection, diagnosis, and reporting (ascertainment) of previously undiagnosed "old" cases rather than increasing numbers or rates of occurrence of new cases. Also, increasing awareness of OSA and its significant clinical sequelae may have increased screening for the condition among otherwise healthy service members; in turn, there may be more complete ascertainment of previously undiagnosed cases. Several studies have documented that high proportions of clinically significantly OSA cases are undiagnosed and thus untreated.[4] In summary, the finding of a sharp increase in incident diagnoses of OSA in active military members may or may not reflect increases in the numbers or incidence rates of actual cases.

A prominent risk factor for the development of OSA is obesity (or more generally, increasing body mass index [BMI]). Obesity was a frequent comorbid diagnosis with incident OSA diagnoses among military members. Also, concomitant with the increase in incident diagnoses of OSA, medical encounters for overweight /obesity have steadily increased recently among U.S. military members.[6] Weight loss can be an effective treatment strategy for overweight patients with clinically significant OSA; as little as 10% reductions in weight have provided clinically significant improvements in apnea-hypopnea episodes among OSA patients.

The comorbid diagnoses most frequent in this analysis were generally similar to those most frequent among OSA cases identified using a Veterans Health Administration (VHA) database[5] and a civilian medical data repository.[7] These conditions included obesity, tobacco use, cardiovascular diagnoses such as hypercholesterolemia and hypertension, and other respiratory symptoms. Of note, some conditions that were frequently comorbid with OSA in other populations were relatively infrequent in this analysis (e.g., type 2 diabetes, heart failure); it is likely, however, that active military members are significantly younger and generally healthier than military veterans and members of the general population with OSA diagnoses.

Given the latency periods for the development of many of the comorbid conditions frequently seen with OSA, it is possible that OSA is a precursor to some serious chronic medical conditions and not simply a proxy for obesity. Both clinical and epidemiologic studies have demonstrated strong and independent associations between OSA and cardiovascular conditions; the evidence for an independent association between OSA and diabetes is not as strong.[4] OSA patients tend to be heavy users of health care services; this characteristic is likely a consequence of the comorbid conditions that are associated with OSA.[4] In light of increasing emphasis on cost cutting in the military health care system,[8,9] greater scrutiny is warranted of conditions that--if treated and controlled--could significantly reduce not only health care costs but also burdens of morbidity and mortality among military members.

References:

1. Caples SM, Gami AS, Somers VK. Obstructive Sleep Apnea. *Ann Intern Med*. 2005;142(3):187-197.
2. Young T, Peppard PE, Gottlieb DJ. Epidemiology of Obstructive Sleep Apnea: A Population Health Perspective. *Am. J. Respir. Crit. Care Med*. 2002;165(9):1217-1239.
3. Somers VK, White DP, Amin R, et al. Sleep Apnea and Cardiovascular Disease: An American Heart Association/American College of Cardiology Foundation Scientific Statement From the American Heart Association Council for High Blood Pressure Research Professional Education Committee, Council on Clinical Cardiology, Stroke Council, and Council on Cardiovascular Nursing In Collaboration With the National Heart, Lung, and Blood Institute National Center on Sleep Disorders Research (National Institutes of Health). *Circulation*. 2008;118(10):1080-1111.
4. Lee W, Nagubadi S, Kryger M, Mokhlesi B. Epidemiology of Obstructive Sleep Apnea: A Population-based Perspective. *Exp Rev in Resp Med*. 2008;2(3):349-364
5. Sharafkhaneh A, Richardson P, Hirshkowitz M. Sleep apnea in a high risk population: a study of the Veterans Health Administration beneficiaries. *Sleep Med*. 2004;5(4):345-350.
6. Armed Forces Health Surveillance Center. Diagnoses of overweight/ obesity, active component, U.S. Armed Forces, 1998-2008. *Medical Surveillance Monthly Report (MSMR)*. 2009;16(01):2-6.
7. Huang Q, Qin Z, Zhang S, Chow C. Clinical patterns of obstructive sleep apnea and its comorbid conditions: a data mining approach. *J Clin Sleep Med.* 20084(6):543-550.
8. Philpott T. Health care: The thing that ate the Pentagon. *Stars and Stripes*. 18 April 2009.
9. Jaffe G. Gates: Cuts in Pentagon bureaucracy needed to help maintain military force. *Washington Post.* 9 May 2010.

Insomnia, Active Component, U.S. Armed Forces, January 2000-December 2009

Insomnia is regarded as the most common sleep disorder in adults in the United States. Definitions of insomnia that are used to estimate prevalence vary widely; in turn, the choice of definition significantly impacts estimates of prevalence. The least stringent case definition requires self report of one or more symptoms of insomnia: difficulty initiating sleep, early awakening, non-restorative or poor quality of sleep. Use of this definition has yielded prevalence estimates as high as 30 percent. If another symptom (e.g., perceived daytime impairment, distress due to insomnia) is added to the case definition, prevalence estimates decline to approximately 10 percent. Applying even more stringent criteria (such as persistence for at least one month of symptoms that are independent of other sleep disorders, mental disorders, or as a result of substance abuse or medical conditions) further reduces prevalence estimates to approximately 6 percent. [1,2]

There are numerous risk factors for insomnia. Associated demographic factors include age and gender, with the diagnosis being more common in women and older adults. Several other occupational and environmental risk factors for insomnia are common for military personnel such as rotating shifts or night shift work, stress, and frequent moves, including deployment. [2,3]

Insomnia has been shown to be both a precipitant and consequence of numerous comorbid medical diagnoses; the most frequent comorbid diagnoses are mental disorders. Depression and anxiety disorders are the most commonly cited conditions associated with chronic insomnia, with some studies reporting that 40% of insomniacs have a concurrent psychiatric condition. Notably, within active component and veteran populations, strong associations of insomnia with both post traumatic stress disorder (PTSD) and traumatic brain injury (TBI) have been documented.[4,5]

Insomnia, and its attendant consequences like fatigue, have significant public health consequences due to the impact of sleep loss on psychomotor, cognitive, and social functioning.[6] Insomniacs have been shown to be at increased risk for both work-related and motor vehicle accidents.[6] In a military setting, the consequences of work-related accidents can be magnified given the nature and demands of military operations; for example, fatigue is cited as the primary cause of military aviation mishaps.[7,8]

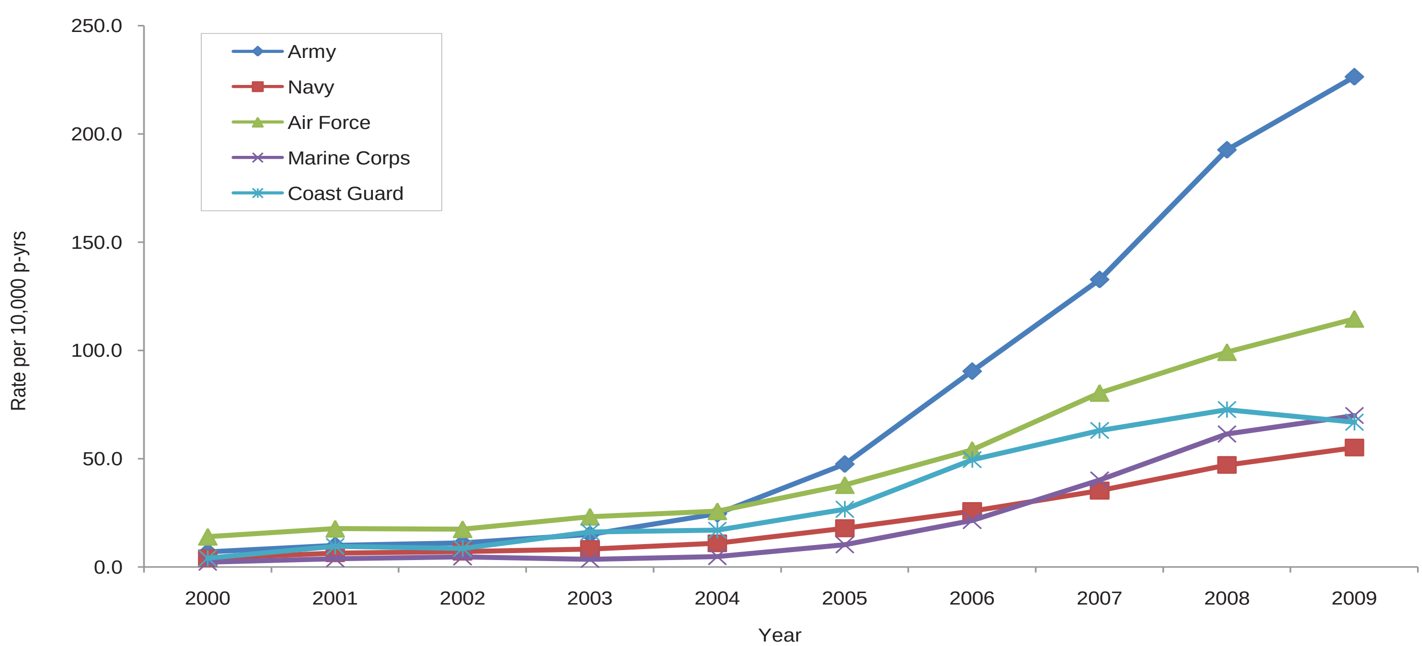
This report summarizes numbers, rates, and trends of incident diagnoses of insomnia and comorbid conditions with insomnia among active component military members during the past 10 years.

Methods:

The surveillance period was from 1 January 2000 to 31 December 2009. The surveillance population included all individuals who served in the active component of the Army, Navy, Air Force, Marine Corps or Coast Guard at any time during the surveillance period.

For surveillance purposes, an incident case of insomnia was defined as two or more ambulatory visits within 90 days

Figure 1. Annual incidence rates of insomnia, by Service and calendar year, active component, U.S. Armed Forces, 2000-2009



of each other or a hospitalization with one of the following ICD-9 codes in any diagnostic position: 307.41 "transient insomnia"; 307.42 "persistent insomnia"; 327.00-327.02 "organic insomnias"; 327.09 "other organic insomnias"; or 780.52 "insomnia, unspecified". Each individual could be an incident case once per year during the surveillance period. Comorbid conditions were classified as any other ICD-9 diagnosis code in any of the other diagnostic positions for incident cases of insomnia. The 20 most frequent co-occurring ICD-9 diagnoses for inpatient and outpatient incident cases were identified after codes indicating other insomnia diagnoses, tobacco dependence [305.1], and routine medical examinations [V70.0–V70.5] were excluded.

Counts and rates of incident cases were also categorized by deployment status. Incident insomnia diagnoses were divided into two categories: first, incident diagnoses made among active component members who were diagnosed prior to their first Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) deployment or had never been deployed to OEF/OIF; and second, incident diagnoses made anytime after deployment to OIF/OEF. For this analysis, OEF/OIF service of at least 30 consecutive days was considered a deployment.

Results:

During the 10 years between 2000 through 2009, there were 68,776 incident diagnoses of insomnia among active component service members. The crude overall incident rate was 48.4 cases per 10,000 person-years (p-yrs) **(Table 1).**

Counts and rates of incident diagnoses of insomnia substantially increased during the surveillance period; the crude incidence rate of insomnia increased from 7.2 to 135.8 cases per 10,000 p-yrs. During the period, incidence rates increased in all of the services; however, the greatest increase by far was in the Army **(Figure 1)**.

In contrast to the published literature regarding insomnia, incidence rates did not increase in a linear fashion with increasing age. As expected, crude incidence rates were lowest among the youngest (<20 years) and highest among the oldest (>40 years) military members; however, rates did not increase with age or sharply vary among the others (20-39 years). Throughout the period, as expected, the crude incidence rate was nearly twice as high among females as males. Overall, the incidence rate among service members in health care occupations (77.4 per 10,000 p-yrs) was approximately two-thirds higher than among those in combat-specific and other military occupational categories **(Table 1)**.

By far, the diagnosis comprising the majority of all incident insomnia diagnoses was "insomnia, unspecified"; the diagnosis accounted for approximately 70% of all insomnia diagnoses during the period (data not shown). The most frequent concurrent diagnosis (at the 3-digit level of the ICD-9-CM) with insomnia was "adjustment reaction" **(Figure 2)** and

Table 1. Incident diagnoses and incidence rates of insomnia, active component, U.S. Armed Forces, January 2000-December 2009

	Total 2000-2009		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009	
	No.	Rate[a]	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Total	68,776	48.4	1,013	7.2	1,410	10.1	1,531	10.7	2,011	13.9	2,724	18.7	4,567	32.3	7,781	55.5	11,613	82.9	16,495	116.2	19,631	135.8
Service																						
Army	39,429	79.2	327	6.9	471	9.9	529	11.0	731	14.9	1,210	24.6	2,308	47.5	4,453	90.4	6,773	132.7	10,241	192.6	12,386	226.4
Navy	7,384	20.8	145	4.0	229	6.2	264	7.0	307	8.1	403	10.9	637	17.8	889	25.7	1,175	35.2	1,542	47.0	1,793	55.1
Air Force	16,398	47.0	491	14.0	615	17.7	628	17.4	852	23.2	962	25.7	1,336	37.8	1,861	54.0	2,679	80.3	3,220	99.1	3,754	114.5
Marine Corps	4,220	23.4	36	2.1	62	3.6	79	4.6	59	3.3	83	4.7	181	10.1	381	21.4	731	40.0	1,192	61.3	1,416	69.8
Coast Guard	1,345	34.8	14	4.0	33	9.4	31	8.5	62	16.2	66	16.9	105	26.6	197	49.5	255	63.0	300	72.6	282	66.9
Sex																						
Male	54,326	44.7	778	6.5	1,022	8.6	1,144	9.4	1,455	11.8	1,984	16.0	3,459	28.6	5,998	50.0	9,114	75.9	13,426	110.2	15,946	128.6
Female	14,450	70.0	235	11.7	388	18.9	387	18.3	556	25.8	740	34.4	1,108	53.9	1,783	88.1	2,499	124.7	3,069	152.4	3,685	179.3
Race/ethnicity																						
White, non-Hispanic	45,315	50.4	696	7.9	990	11.2	1,082	12.0	1,349	14.8	1,844	20.1	3,076	34.4	5,131	57.9	7,714	86.8	10,749	119.0	12,684	137.9
Black, non-Hispanic	11,831	46.8	160	5.8	231	8.4	241	8.8	357	13.2	467	17.9	780	31.8	1,297	55.0	1,959	85.2	2,831	122.8	3,508	150.8
Other	11,630	43.2	157	6.5	189	7.8	208	8.2	305	11.4	413	15.0	711	25.7	1,353	48.5	1,940	68.9	2,915	102.1	3,439	117.4
Age																						
<20	3,541	25.2	116	7.7	169	10.5	150	9.2	191	12.3	188	12.8	285	21.9	422	33.7	620	49.2	670	52.9	730	59.9
20-24	22,272	46.4	372	8.5	496	11.0	567	12.0	699	14.0	1,007	19.9	1,540	31.3	2,546	52.2	3,839	79.6	5,292	109.1	5,914	120.9
25-29	15,373	52.9	159	5.8	229	8.6	237	8.8	356	12.8	531	18.5	939	32.4	1,697	57.6	2,530	83.9	3,949	125.8	4,746	143.8
30-24	8,675	42.6	95	4.5	140	6.8	155	7.5	209	10.1	303	14.7	536	26.5	1,017	51.3	1,490	75.8	2,085	105.3	2,645	129.8
35-39	8,888	49.9	134	6.7	184	9.5	197	10.4	252	13.6	292	16.4	582	34.5	949	57.1	1,417	85.1	2,183	131.0	2,698	161.8
40+	10,027	78.4	137	11.4	192	15.8	225	17.9	304	23.8	403	30.6	685	52.0	1,150	89.0	1,717	134.4	2,316	178.9	2,898	216.1
Military occupation																						
Combat	13,737	47.4	116	4.1	149	5.3	172	6.1	236	8.2	353	12.1	768	25.7	1,434	49.3	2,379	81.1	3,878	129.8	4,252	145.4
Health care	8,972	77.2	140	12.2	222	19.2	231	19.8	327	27.8	420	35.5	648	56.0	1,119	96.6	1,520	131.8	1,954	169.9	2,391	205.0
Other	46,067	45.4	757	7.6	1,039	10.4	1,128	11.0	1,448	13.9	1,951	18.7	3,151	31.5	5,228	52.6	7,714	77.7	10,663	106.0	12,988	125.3

[a]Rate per 10,000 person-years

Figure 2a. Conditions diagnosed concurrently with insomnia during hospitalization, active component, U.S. Armed Forces, 2000-2009

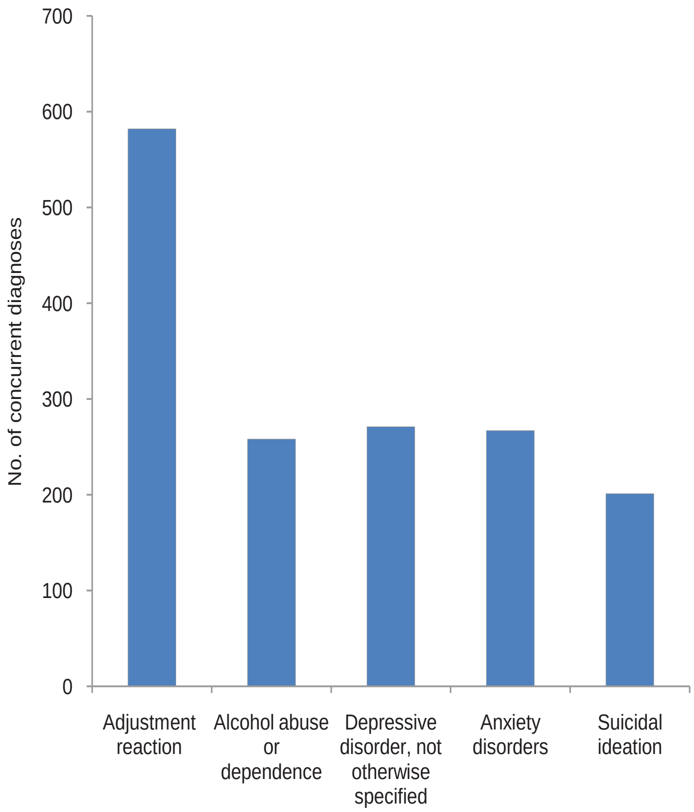
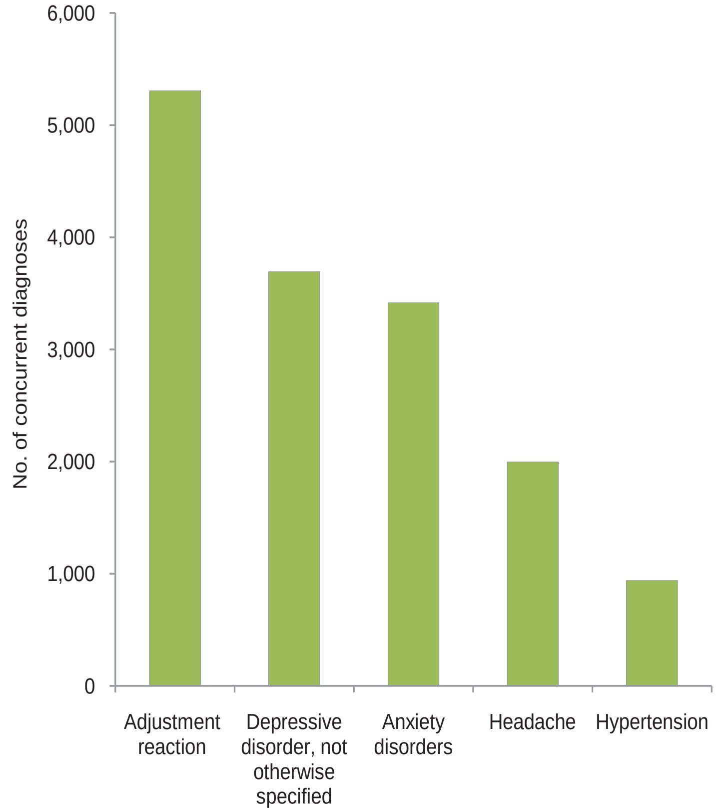


Figure 2b. Conditions diagnosed concurrently with insomnia during ambulatory visits, active component, U.S. Armed Forces, 2000-2009



the most frequent diagnosis within that category was "post traumatic stress disorder" (ICD-9-CM: 309.81) (data not shown). Of the 10 most frequent concurrent diagnoses with insomnia, only two — headache and hypertension — were not mental health conditions **(Figure 2).**

Finally, from pre to post OEF/OIF deployment, incidence rates increased more than 2.5-fold in the Army **(Figure 3)**, among those in combat-specific occupations, and among those older than 25 years.

Editorial comment:

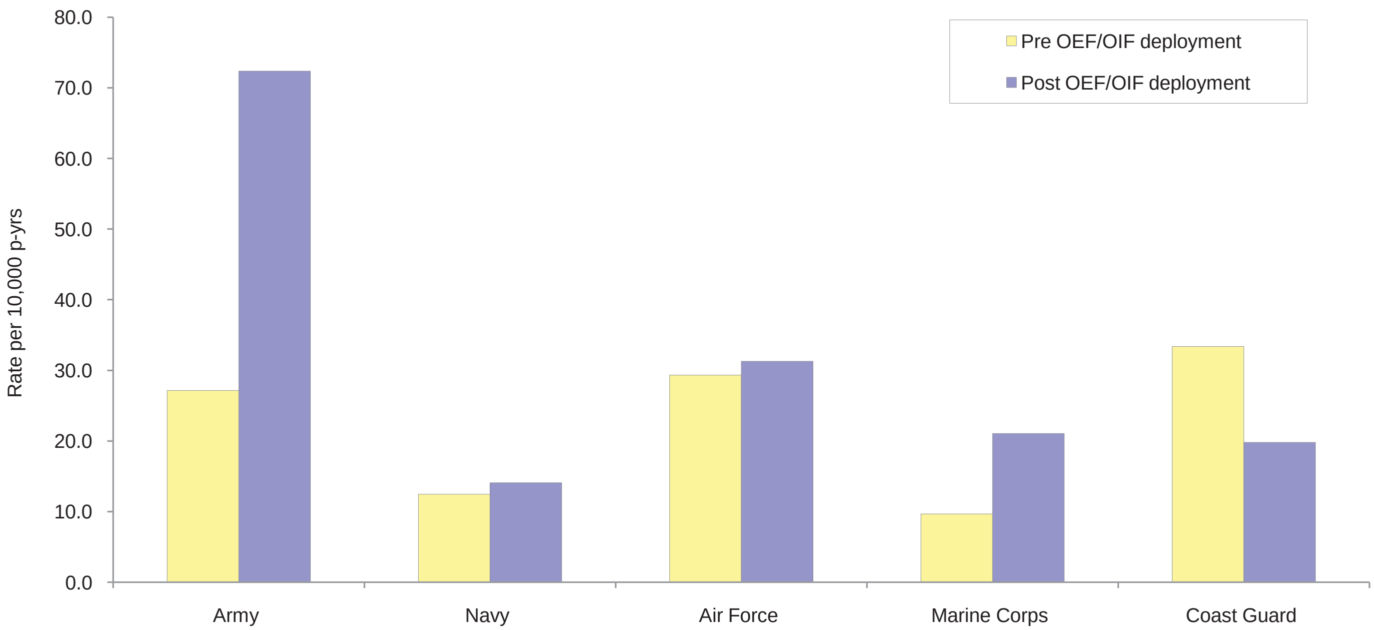
This report documents increasing numbers and rates of insomnia diagnoses over the last 10 years among active component members of the U.S. Armed Forces.

Insomnia is a clinical management challenge because the diagnosis generally relies on patient self-report. In addition, it is a condition that is virtually universal; almost all individuals experience difficulty sleeping sometime in their lives.[2] This analysis did not seek to capture transient, limited or acute episodes of insomnia; rather, it was designed to detect more persistent, chronic cases. In turn, for this analysis, cases that were diagnosed in the outpatient setting required at least two insomnia-related visits within a 90-day period.

There are limitations to the analysis that should be considered when interpreting the results. For example, for this analysis, each service member could be considered an "incident case" once per calendar year; hence, the same individual could be counted as a case more than once — and as many as ten times during the entire surveillance period. Thus, while annual increases in numbers and rates may reflect increasing diagnoses of "newly acquired" insomnia, the later years of the period include individuals first diagnosed with insomnia during previous years. As a result, "incident diagnoses" of insomnia during the later years of the period reflect not only new clinical presentations of insomnia but also some chronic, persistent, and reoccurring cases. Also, as with all *MSMR* analyses and health surveillance in general, the criteria used to ascertain cases ("surveillance case definitions"), including case defining diagnostic codes ("indicator diagnoses") and rules regarding the timing and settings of relevant clinical encounters, significantly impact estimates of the numbers and rates of cases of conditions of interest.[9]

Many cases of insomnia occur concurrently with other conditions. Such occurrences are sometimes considered "secondary insomnia" cases. This analysis did not attempt to characterize cases as "primary" or "secondary." Thus, we analyzed cases where insomnia was the primary (first-listed) diagnosis together with those reported as secondary to other medical conditions or mental disorders. The decision to analyze "primary" and "secondary" insomnias together

Figure 3. Incidence rates of insomnia by Service and timing of diagnosis in relation to deployment, active component, U.S. Armed Forces, 2000-2009



was informed by a recent National Institutes of Health consensus panel[6] which concluded that insomnia that co-occurs with other conditions should be considered comorbid insomnia rather than secondary insomnia. The distinction is important because the cause-effect relationships between insomnia and most co-occurring conditions have not been definitively established.[10]

Comparisons of incidence rates by deployment status illustrate several interesting findings. Notably, in the Army and Marine Corps (but not the other Services), rates increased more than two-fold from pre- to post-OEF/OIF deployment **(Figure 3)**. The largest relative increase in rates from pre- to post-deployment affected service members in combat-specific occupations; in this group overall, rates of incident diagnoses of insomnia increased more than 4-fold from pre- (12.0 per 10,000 p-yrs) to post- (49.1 per 10,000 p-yrs) OEF/OIF deployment.

Military members are subject to many of the recognized factors associated with the development of insomnia including stress, shift work, jet lag, frequent disruptions of sleep, and frequent changes of location. It is not surprising that many military members report difficulty sleeping during combat-related service in far distant and unfamiliar settings.[3]

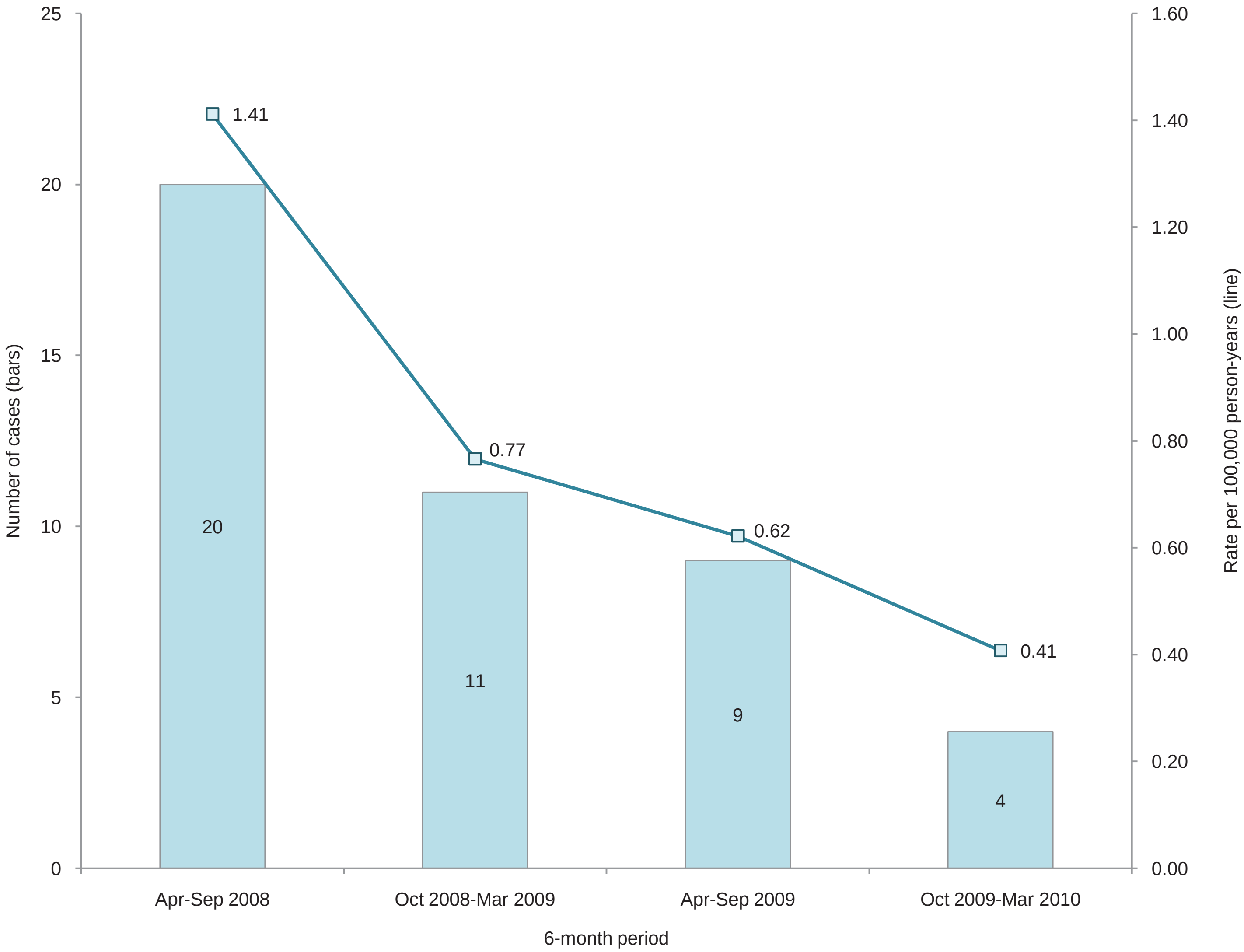
Insomnia can be treated successfully with both pharmacologic and non-pharmacologic treatments; however, behavioral therapy is the treatment of choice for chronic insomnia. Behavioral interventions which may be effective for insomnia include the promotion of good sleep hygiene practices such as establishing a regular bedtime routine, avoiding alcohol consumption or vigorous exercise close to bedtime, and creating a sleep promoting environment that is dark, cool, and comfortable.

References:

1. Ohayon MM. Epidemiology of insomnia: what we know and what we still need to learn. *Sleep Med Rev*. 2002;6(2):97-111.
2. Roth T. Insomnia: Definition, Prevalence, Etiology and Consequences. *J Clin Sleep Med*. 2007;3(5):S7-S10
3. Peterson AL, Goodie MJL, Satterfield WA, Brim WL. Sleep Disturbance during Military Deployment. *Mil Med*. 03 2008;173(3):230-235.
4. Castriotta R, Atanasov S, Wilde M, Masel B, Lai J, Kuna S. Treatment of Sleep Disorders after Traumatic Brain Injury. *J Clin Sleep Med*. 2009;5(2):137-144.
5. Germain A, Buyesse D, Nofzinger E. Sleep-specific mechanisms underlying posttraumatic stress disorder: integrative review and neurobiological hypotheses. *Sleep Med Rev*. 2008;12(3):185-195.
6. National Institutes of Health. NIH State of the Science Conference Statement on Manifestations and Management of Chronic Insomnia in Adults. *Sleep*. 2005;28:1049-1057
7. Caldwell JA. Fatigue in aviation. *Travel Medicine and Infectious Disease*. 2005;3(2):85-96.
8. Naval Safety Center. Fatigue: The Importance of Proper Rest. Approach: *The Navy & Marine Corps Aviation Safety Magazine*. 2007;52(5):3-32.
9. Armed Forces Health Surveillance Center. Deriving case counts from medical encounter data: considerations when interpreting health surveillance reports. *Medical Surveillance Monthly Report (MSMR)*. 2009;16(12):2-8.
10. Sarsour K, Morin CM, Foley K, Kalsekar A, Walsh JK. Association of insomnia severity and comorbid medical and psychiatric disorders in a health plan-based sample: Insomnia severity and comorbidities. *Sleep Med*.11(1):69-74.

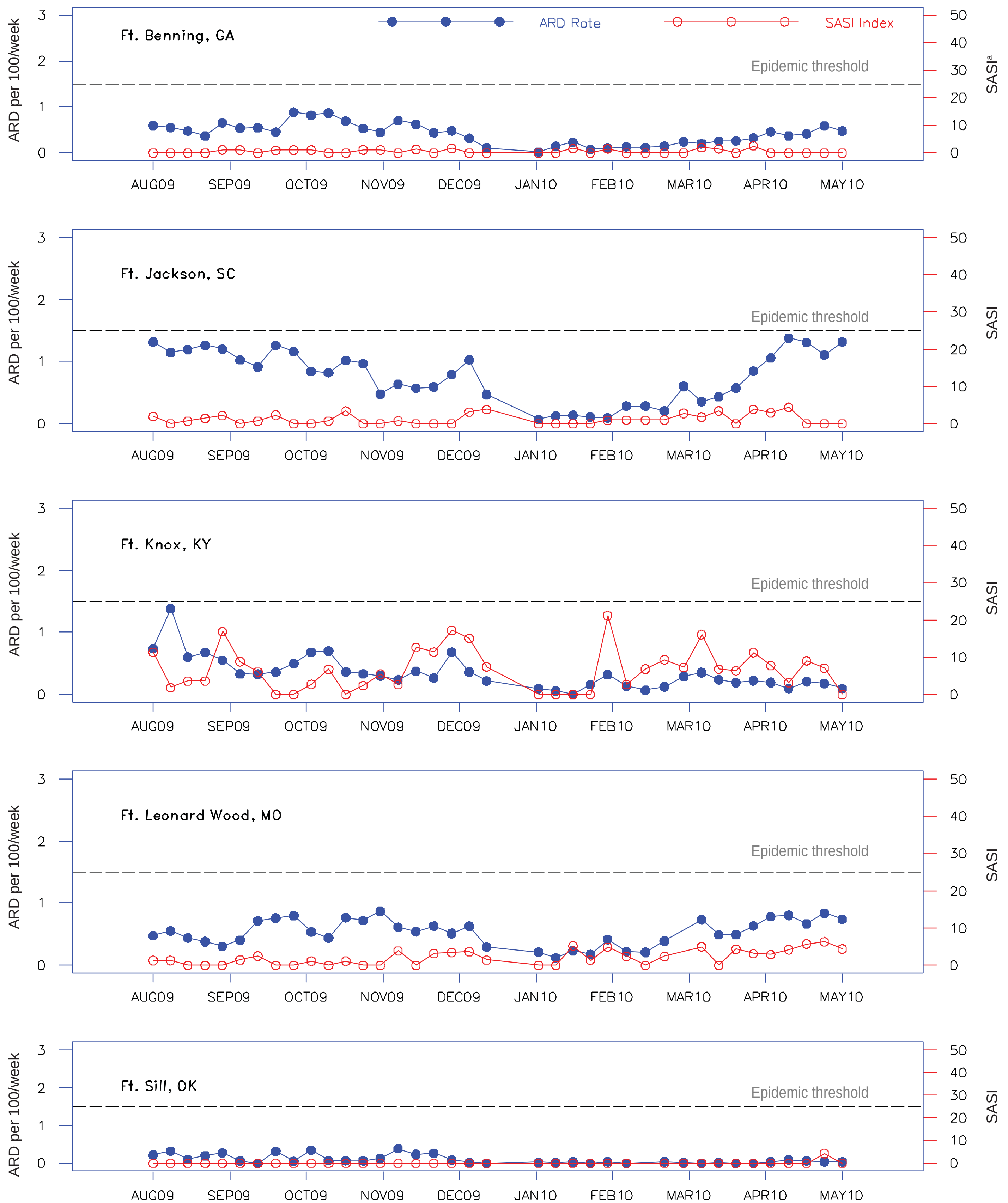
Surveillance Snapshot: Q Fever

Incident cases and incidence rates of Q fever[a], active component, U.S. Armed Forces, April 2008-March 2010



[a]An incident case of Q fever (ICD-9-CM: 083.0) was defined as a reportable medical event, a primary (first-listed) inpatient discharge diagnosis, or two primary outpatient diagnoses within 30 days. Data sources: Defense Medical Surveillance System (DMSS) and Theater Medical Data Store (TMDS).

Acute respiratory disease (ARD) and streptococcal pharyngitis rates (SASI[a]), basic combat training centers, U.S. Army, by week, August 2009-May 2010



[a]Streptococcal-ARD surveillance index (SASI) = ARD rate x % positive culture for group A streptococcus
ARD rate = cases per 100 trainees per week
ARD rate ≥ 1.5 or SASI ≥ 25.0 for 2 consecutive weeks are surveillance indicators of epidemics

Update: Deployment Health Assessments, U.S. Armed Forces, April 2010

In April 2010, there were lower numbers of deployment health pre- and post-deployment health assessment forms transmitted to the Armed Forcces Health Surveillance Center than at any time during the past seven years **(Table 1, Figure 1)** . Since January 2003, peaks and troughs in the numbers of pre- and post-deployment health assessment forms transmitted generally corresponded to times of departure and return of large numbers of deployers. The numbers of post-deployment health reassessments (PDHRA) transmitted in April 2010 were the lowest in the past four years. Between April 2006 and March 2010, the number of forms per month ranged from 17,000 to 43,000 **(Table 1, Figure 1).**

During the past 12 months, the proportions of returned deployers who rated their health as "fair" or "poor" were 9-11% on post-deployment health assessment questionnaires and 10-14% on PDHRA questionnaires **(Figure 2).**

In general, on post-deployment assessments and reassessments, deployers in the Army and in reserve components were more likely than their respective counterparts to report health and exposure-related concerns **(Table 2, Figure 2).** Both active and reserve component members were more likely to report exposure concerns three to six months after compared to the time of return from deployment **(Figure 3).**

At the time of return from deployment, soldiers serving in the active component were the most likely of all deployers to receive mental health referrals; however, three to six months after returning, active component soldiers were less likely than Army Reservists to receive mental health referrals **(Table 2).**

Finally, during the past three years, reserve component members have been more likely than active to report "exposure concerns" on post-deployment assessments and reassessments **(Figure 3).**

Table 1. Deployment-related health assessment forms, by month, U.S. Armed Forces, May 2009-April 2010

	Pre-deployment assessment DD2795		Post-deployment assessment DD2796		Post-deployment reassessment DD2900	
	No.	%	No.	%	No.	%
Total	**418,881**	**100**	**391,884**	**100**	**294,986**	**100**
2009						
May	36,289	8.7	28,352	7.2	25,062	8.5
June	44,455	10.6	28,795	7.3	26,985	9.1
July	40,036	9.6	28,765	7.3	22,743	7.7
August	39,195	9.4	46,753	11.9	21,762	7.4
September	30,574	7.3	39,576	10.1	26,225	8.9
October	36,413	8.7	32,438	8.3	24,046	8.2
November	32,189	7.7	32,867	8.4	20,607	7.0
December	30,623	7.3	36,471	9.3	28,971	9.8
2010						
January	55,183	13.2	34,108	8.7	25,620	8.7
February	31,047	7.4	27,365	7.0	26,727	9.1
March	31,550	7.5	43,111	11.0	35,123	11.9
April	11,327	2.7	13,283	3.4	11,115	3.8

Figure 2. Proportion of deployment health assessment forms with self-assessed health status as "fair" or "poor", U.S. Armed Forces, May 2009-April 2010

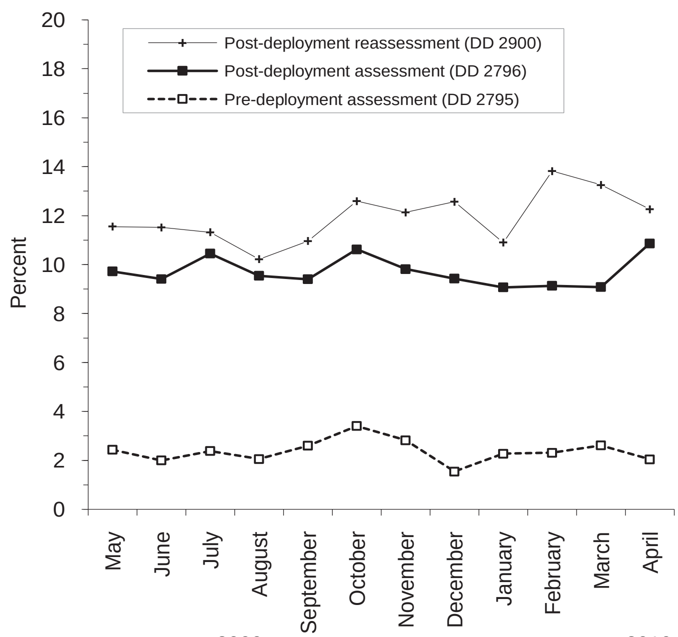


Figure 1. Total deployment health assessment and reassessment forms, by month, U.S. Armed Forces, January 2003-April 2010

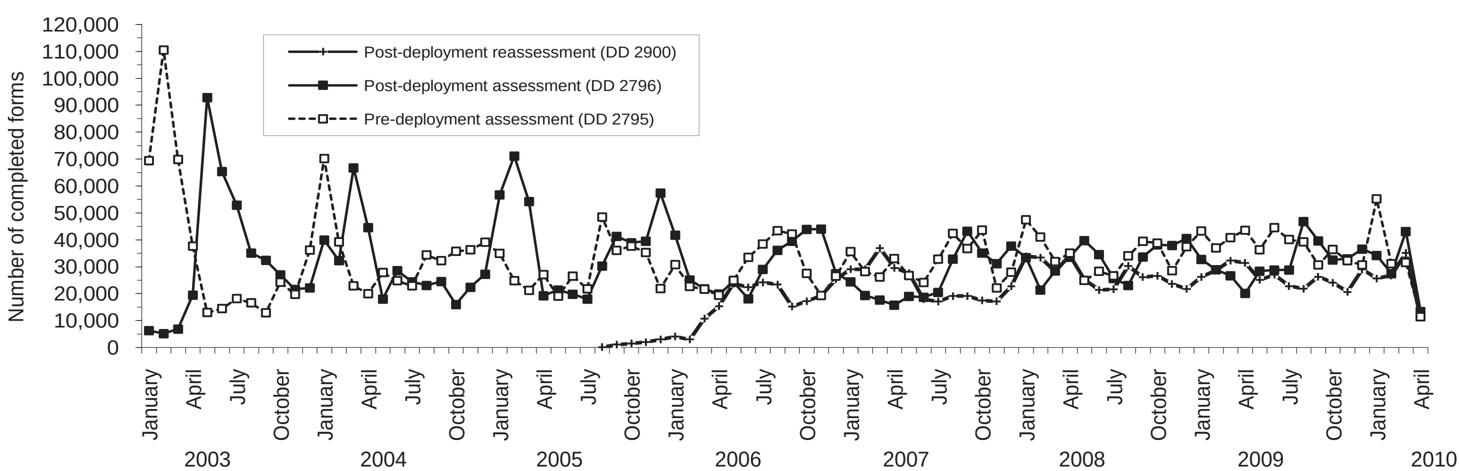


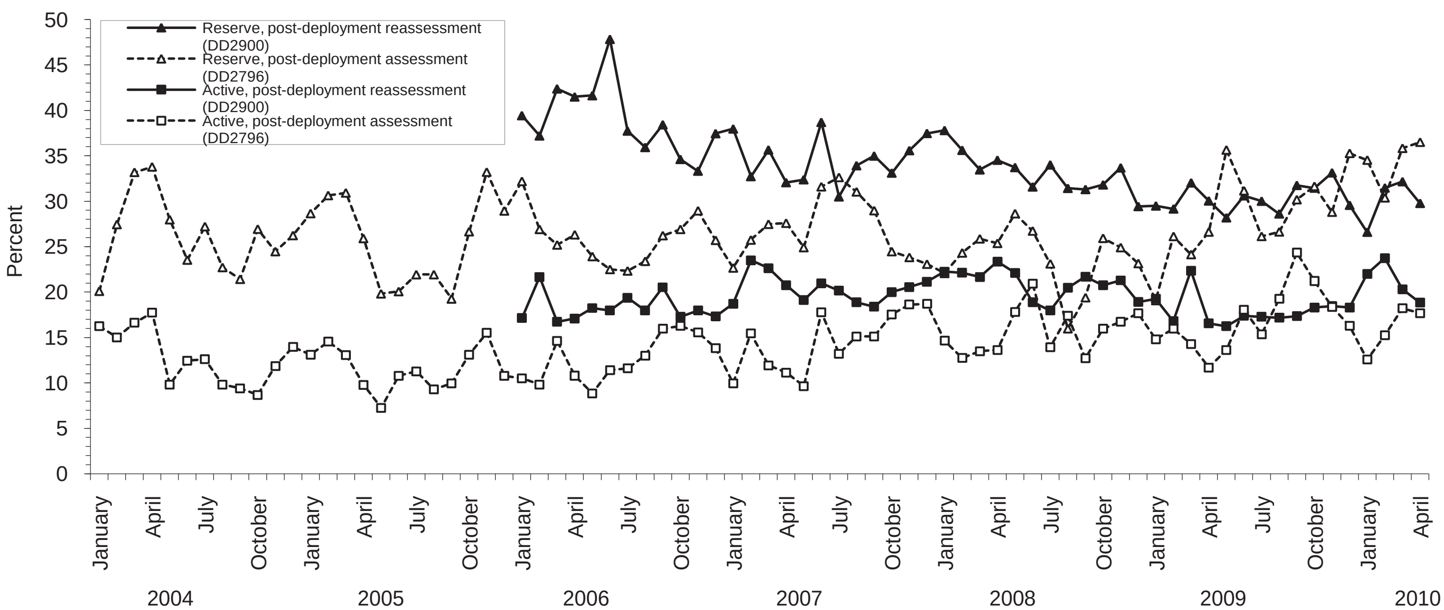
Table 2. Percentage of service members who endorsed selected questions/received referrals on health assessment forms, U.S. Armed Forces, May 2009-April 2010

	Army			Navy			Air Force			Marine Corps			All service members		
	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900
Active component	n= 148,140	n= 129,168	n= 119,065	n= 19,014	n= 12,270	n= 12,761	n= 57,213	n= 50,668	n= 47,913	n= 31,260	n= 23,983	n= 33,799	n= 255,627	n= 216,089	n= 213,538
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	3.8	10.3	14.9	1.3	4.6	6.0	0.5	3.4	4.1	1.5	7.0	9.7	2.6	8.0	11.1
Health concerns, not wound or injury	21.4	25.7	25.1	3.3	11.9	14.0	1.3	5.7	10.4	2.8	11.9	17.5	13.3	18.7	20.0
Health worse now than before deployed	na	22.4	26.2	na	12.0	12.9	na	8.5	8.3	na	14.8	18.6	na	17.7	20.2
Exposure concerns	na	19.0	19.7	na	18.7	19.5	na	12.0	14.6	na	13.9	21.5	na	16.8	18.9
PTSD symptoms (2 or more)	na	8.6	12.0	na	5.0	6.7	na	2.5	2.4	na	5.3	8.4	na	6.6	9.0
Depression symptoms (any)	na	30.7	32.5	na	21.6	23.3	na	13.1	13.7	na	25.3	29.8	na	25.4	27.3
Referral indicated by provider (any)	5.0	34.0	24.2	4.8	20.4	16.8	1.7	11.4	7.0	3.9	18.5	27.7	4.1	26.2	20.5
Mental health referral indicated[a]	1.1	6.7	9.8	0.7	2.8	6.0	0.5	1.4	1.8	0.2	1.5	4.9	0.8	4.7	7.0
Medical visit following referral[b]	92.7	99.6	98.7	85.0	92.3	92.6	84.8	96.8	98.3	43.3	78.0	93.2	84.7	97.6	96.9

	Army			Navy			Air Force			Marine Corps			All service members		
	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900
Reserve component	n= 72,132	n= 77,644	n= 51,109	n= 5,267	n= 3,624	n= 4,785	n= 15,067	n= 13,843	n= 16,010	n= 3,732	n= 3,782	n= 6,254	n= 96,198	n= 98,893	n= 78,158
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	1.4	11.9	16.5	0.5	10.1	8.7	0.3	5.0	4.9	0.8	7.7	11.6	1.2	10.7	13.2
Health concerns, not wound or injury	19.4	34.4	42.4	1.3	34.2	30.8	0.6	8.5	14.7	3.2	24.1	36.3	14.9	30.4	35.5
Health worse now than before deployed	na	26.6	31.7	na	21.2	20.3	na	13.1	10.9	na	19.6	27.3	na	24.2	26.4
Exposure concerns	na	33.5	31.8	na	43.3	34.1	na	19.9	23.0	na	12.0	33.3	na	31.1	30.2
PTSD symptoms (2 or more)	na	8.7	18.3	na	6.1	11.5	na	2.3	2.8	na	3.1	14.0	na	7.5	14.4
Depression symptoms (any)	na	31.2	33.9	na	26.5	24.2	na	14.1	13.4	na	29.7	28.0	na	28.6	28.6
Referral indicated by provider (any)	4.0	36.6	33.9	3.3	29.0	19.2	0.5	13.9	6.4	3.9	26.7	30.2	3.4	32.7	27.1
Mental health referral indicated[a]	0.4	5.0	11.9	0.2	2.7	5.3	0.0	0.9	0.9	0.1	2.0	9.6	0.3	4.2	9.1
Medical visit following referral[b]	92.7	98.9	37.9	96.4	97.3	42.6	57.9	67.5	41.8	38.1	71.2	29.5	87.2	96.2	37.7

[a]Includes behavioral health, combat stress and substance abuse referrals.
[b]Record of inpatient or outpatient visit within 6 months after referral.

Figure 3. Proportion of service members who endorsed exposure concerns on post-deployment health assessments, U.S. Armed Forces, January 2004-April 2010



Sentinel reportable events among service members and beneficiaries at U.S. Army medical facilities, cumulative numbers[a] for calendar years through 30 April 2009 and 30 April 2010

Army

Reporting locations	Number of reports all events[b]		Food-borne						Vaccine preventable					
			Campylo-bacter		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella[c]	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
NORTHERN														
Aberdeen Proving Ground, MD	3	9	.	.	.	.	.	.	.	.	.	.	.	.
Fort Belvoir, VA	99	41	4	1	1	.	.	.	.	.	.	.	.	.
Fort Bragg, NC	604	524	.	.	3	3	.	.	.	.	2	.	.	.
Fort Dix, NJ	0	0	.	.	.	.	.	.	.	.	.	.	.	.
Fort Drum, NY	14	0	.	.	.	.	.	.	.	.	.	.	.	.
Fort Eustis, VA	78	84	.	.	.	.	.	.	.	.	.	.	.	.
Fort George G Meade, MD	24	0	.	.	.	.	.	.	.	.	.	.	.	.
Fort Knox, KY	58	114	.	.	.	1	.	1	.	.	.	.	.	.
Fort Lee, VA	221	175	.	.	.	.	.	.	.	.	.	.	.	.
Fort Monmouth, NJ	26	14	.	.	.	.	.	.	.	.	.	.	.	.
Walter Reed AMC, DC	66	21	.	.	.	1	.	.	.	.	1	.	1	.
West Point Military Reservation, NY	31	23	1	.	.	.	.	.	.	.	.	.	.	.
SOUTHERN														
Fort Benning, GA	76	3	.	.	.	.	1	.	.	.	.	.	.	.
Fort Campbell, KY	54	192	.	.	.	.	.	.	.	.	.	.	.	.
Fort Gordon, GA	256	271	.	2	1	2	1	1	.	.	.	.	1	.
Fort Hood, TX	608	709	4	3	7	1	2	22	.	.	.	1	.	.
Fort Jackson, SC	99	133	.	.	.	.	.	.	.	.	.	.	.	.
Fort Polk, LA	147	142	.	.	.	.	.	.	.	.	.	.	.	.
Fort Rucker, AL	35	40	7	.	1	.	.	.	.	.	.	1	.	.
Fort Sam Houston, TX	203	182	1	.	2	1	.	.	.	.	.	.	.	.
Fort Sill, OK	96	152	.	.	.	.	2	1	.	.	.	.	.	.
Fort Stewart, GA	402	213	.	1	3	2	4	1	.	.	.	1	.	.
WESTERN														
Fort Bliss, TX	193	162	.	1	1	1	1	1	1	.	5	.	.	.
Fort Carson, CO	267	252	1	3	.	1	.	.	.	.	.	.	.	.
Fort Huachuca, AZ	24	32	.	.	.	2	.	.	.	.	.	.	.	.
Fort Leavenworth, KS	19	15	.	.	.	.	.	.	.	.	.	.	.	.
Fort Leonard Wood, MO	159	135	.	.	.	1	.	.	1	.	.	.	1	.
Fort Lewis, WA	402	305	.	2	1	1	.	.	.	.	.	.	.	.
Fort Riley, KS	169	88	.	.	1	1	.	1	.	.	.	.	.	.
Fort Wainwright, AK	86	116	.	.	.	.	.	.	.	.	.	.	.	.
NTC and Fort Irwin, CA	46	42	.	.	.	.	1	.	.	.	.	.	.	.
PACIFIC														
Hawaii	242	297	9	9	3	6	.	4	.	1	1	.	.	.
Japan	3	0	.	.	.	.	.	.	.	.	.	.	.	.
Korea	208	133	.	.	.	.	.	.	.	.	.	.	.	.
EUROPEAN														
Heidelberg	45	56	3	5	1	4	.	1	.	.	.	.	.	.
Landstuhl	273	153	2	2	2	.	.	2	.	.	1	2	1	.
Bavaria	180	122	3	1	2	.	.	.	.	.	.	.	.	.
CENTCOM LOCATIONS														
CENTCOM	60	74	.	.	.	.	.	.	.	.	.	.	.	.
Total	**5,576**	**5,024**	**35**	**30**	**29**	**28**	**12**	**35**	**2**	**1**	**10**	**5**	**4**	**0**

[a]Events reported by May 8, 2009 and 2010
[b]Sixty-seven medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, June 2009.
[c]Service member cases only.
Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events among service members and beneficiaries at U.S. Army medical facilities, cumulative numbers[a] for calendar years through 30 April 2009 and 30 April 2010

Army

Reporting location	Arthropod-borne				Sexually transmitted						Environmental				Travel associated			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis		Cold[c]		Heat[c]		Q Fever		Tuberculosis	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
NORTHERN																		
Aberdeen Proving Ground, MD	.	.	.	.	2	8	1	1	.	.	.	.	.	.	.	.	.	.
Fort Belvoir, VA	.	.	.	.	83	35	11	5	.	.	.	.	.	.	.	.	.	.
Fort Bragg, NC	.	.	.	4	503	420	85	82	2	1	.	8	9	6	.	.	.	.
Fort Dix, NJ	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fort Drum, NY	.	.	.	.	11	.	3	.	.	.	.	.	.	.	.	.	.	.
Fort Eustis, VA	.	.	.	.	66	76	12	6	.	2	.	.	.	.	.	.	.	.
Fort George G Meade, MD	.	.	.	.	24	.	.	.	.	.	.	.	.	.	.	.	.	.
Fort Knox, KY	1	.	.	1	48	106	9	4	.	.	.	.	.	.	.	.	.	1
Fort Lee, VA	1	.	.	.	196	155	22	20	2	.	.	.	.	.	.	.	.	.
Fort Monmouth, NJ	5	8	.	.	19	5	1	.	1	1	.	.	.	.	.	.	.	.
Walter Reed AMC, DC	4	2	.	.	47	13	6	4	6	.	.	.	.	.	.	.	1	1
West Point Military Reservation, NY	6	2	.	.	23	18	1	3	.	.	.	.	.	.	.	.	.	.
SOUTHERN																		
Fort Benning, GA	.	.	3	.	57	.	15	.	.	.	.	.	.	3	.	.	.	.
Fort Campbell, KY	1	.	.	.	41	177	3	13	1	.	.	.	8	2	.	.	.	.
Fort Gordon, GA	.	.	.	.	215	221	38	45	.	.	.	.	.	.	.	.	.	.
Fort Hood, TX	.	.	.	1	474	554	117	125	3	1	.	.	.	.	.	.	1	1
Fort Jackson, SC	.	.	.	.	81	85	18	13	.	.	.	8	.	27	.	.	.	.
Fort Polk, LA	.	.	.	.	137	121	10	20	.	.	.	.	.	1	.	.	.	.
Fort Rucker, AL	.	.	.	.	25	39	2	.	.	.	.	.	.	.	.	.	.	.
Fort Sam Houston, TX	.	.	.	.	169	156	26	17	5	8	.	.	.	.	.	.	.	.
Fort Sill, OK	.	.	.	.	80	135	14	15	.	1	.	.	.	.	.	.	.	.
Fort Stewart, GA	.	.	.	.	330	185	54	23	4	.	.	.	1	.	6	.	.	.
WESTERN																		
Fort Bliss, TX	.	.	.	.	157	137	23	21	4	1	.	.	.	.	.	.	1	.
Fort Carson, CO	.	.	.	.	240	235	26	13	.	.	.	.	.	.	.	.	.	.
Fort Huachuca, AZ	.	.	.	.	24	30	.	.	.	.	.	.	.	.	.	.	.	.
Fort Leavenworth, KS	.	1	.	.	14	14	3	.	1	.	.	.	1	.	.	.	.	.
Fort Leonard Wood, MO	.	.	.	.	139	116	17	17	.	.	1	.	.	1	.	.	.	.
Fort Lewis, WA	.	.	.	.	363	279	37	21	1	1	.	.	.	.	.	.	.	1
Fort Riley, KS	.	.	.	.	143	82	24	4	.	.	1	.	.	.	.	.	.	.
Fort Wainwright, AK	.	.	.	.	79	104	6	3	.	.	1	9	.	.	.	.	.	.
NTC and Fort Irwin, CA	.	.	.	.	44	40	1	2	.	.	.	.	.	.	.	.	.	.
PACIFIC																		
Hawaii	.	.	.	.	200	249	22	27	1	1	.	.	.	.	1	.	5	.
Japan	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.
Korea	.	.	.	.	200	117	5	8	2	.	1	8	.	.	.	.	.	.
EUROPEAN																		
Heidelberg	3	.	.	.	34	40	4	5	.	1	.	.	.	.	.	.	.	.
Landstuhl	7	2	.	2	222	116	28	25	7	.	.	.	1	.	.	.	2	2
Bavaria	4	2	1	.	155	99	14	19	.	1	1	.	.	.	.	.	.	.
CENTCOM LOCATIONS																		
CENTCOM	.	.	.	.	53	68	6	6	1	.	.	.	.	.	.	.	.	.
Total	**32**	**17**	**4**	**8**	**4,701**	**4,235**	**664**	**567**	**41**	**19**	**5**	**33**	**20**	**40**	**7**	**0**	**10**	**6**

Sentinel reportable events among service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers[a] for calendar years through 30 April 2009 and 30 April 2010

Navy

Reporting locations	Number of reports all events[b]		Food-borne						Vaccine preventable					
			Campylo-bacter		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella[c]	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
NATIONAL CAPITOL AREA														
NNMC Bethesda, MD	54	44	.	3	1	.	.	1	.	.	.	2	.	.
NHC Annapolis, MD	2	8	.	.	.	.	.	.	.	.	.	.	.	.
NHC Patuxent River, MD	2	1	.	.	.	.	.	.	.	.	.	.	.	.
NHC Quantico, VA	45	20	1	.	1	.	2	.	.	.	.	1	.	.
NAVY MEDICINE EAST														
NH Beaufort, SC	234	65	.	.	.	.	.	.	1	.	1	.	.	.
NH Camp Lejeune, NC	176	184	.	.	3	.	1	.	.	.	.	1	.	.
NH Charleston, SC	3	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Cherry Point, NC	3	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Corpus Christi, TX	0	3	.	.	.	.	.	.	.	.	.	.	.	.
NHC Great Lakes, IL	6	227	.	.	.	.	.	.	.	.	.	3	.	1
NH Guantanamo Bay, Cuba	0	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Jacksonville, FL	95	57	.	1	4	3	1	.	.	.	.	.	.	.
NH Naples, Italy	1	0	.	.	.	.	.	.	.	.	.	.	.	.
NHC New England, RI	0	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Pensacola, FL	73	49	1	.	1	2	2	.	.	.	.	.	.	.
NMC Portsmouth, VA	60	92	.	.	.	1	.	.	.	.	1	1	.	.
NH Rota, Spain	0	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Sigonella, Italy	1	0	.	.	.	.	.	.	.	.	.	.	1	.
NAVY MEDICINE WEST														
NH Bremerton, WA	2	3	.	.	.	.	.	.	.	.	.	1	.	.
NH Camp Pendleton, CA	6	1	.	.	.	.	.	.	.	.	.	.	.	.
NH Guam-Agana, Guam	25	19	.	.	2	.	.	.	.	.	.	.	.	.
NHC Hawaii, HI	0	299	.	5	.	2	.	.	.	.	.	.	.	.
NH Lemoore, CA	22	1	.	.	.	.	.	.	.	.	.	.	.	.
NH Oak Harbor, WA	48	24	3	.	2	.	.	.	.	.	1	1	1	.
NH Okinawa, Japan	38	19	.	.	.	.	.	.	.	.	.	.	.	.
NMC San Diego, CA	315	245	.	3	4	2	.	1	.	.	26	12	1	.
NH Twentynine Palms, CA	1	1	.	.	.	.	.	.	.	.	.	.	.	.
NH Yokosuka, Japan	26	24	.	.	.	.	.	.	.	.	2	1	.	.
NAVAL SHIPS														
COMNAVAIRLANT/CINCLANTFLEET	17	11	.	.	.	.	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	21	17	.	.	.	.	.	.	.	.	.	.	.	.
OTHER LOCATIONS														
Other	1,615	1,111	4	5	7	2	2	1	1	.	5	14	1	.
Total	**2,891**	**2,525**	**9**	**17**	**25**	**12**	**8**	**3**	**2**	**0**	**36**	**37**	**4**	**1**

[a]Events reported by May 8, 2010
[b]Sixty-seven medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, June 2009.
[c]Service member cases only.
Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events among service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers[a] for calendar years through 30 April 2009 and 30 April 2010

Navy

Reporting location	Arthropod-borne				Sexually transmitted						Environmental				Travel associated			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis		Cold[c]		Heat[c]		Q Fever		Tuberculosis	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
NATIONAL CAPITOL AREA																		
NNMC Bethesda, MD	1	2	.	1	47	24	4	4	1	6	.	.	.	.	.	1	.	.
NHC Annapolis, MD	.	1	.	.	2	7	.	.	.	.	.	.	.	.	.	.	.	.
NHC Patuxent River, MD	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.
NHC Quantico, VA	.	.	.	.	36	17	5	2	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE EAST																		
NH Beaufort, SC	.	.	.	.	222	59	9	6	1	.	.	.	.	.	.	.	.	.
NH Camp Lejeune, NC	3	3	1	2	138	152	24	23	.	.	1	2	5	1	.	.	.	.
NH Charleston, SC	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.
NH Cherry Point, NC	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Corpus Christi, TX	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.
NHC Great Lakes, IL	.	.	.	.	6	199	.	24	.	.	.	.	.	.	.	.	.	.
NH Guantanamo Bay, Cuba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Jacksonville, FL	.	.	.	.	84	49	6	2	.	1	.	.	.	.	.	.	.	1
NH Naples, Italy	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC New England, RI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Pensacola, FL	.	.	.	.	62	38	4	7	1	2	.	.	.	.	2	.	.	.
NMC Portsmouth, VA	.	.	.	2	45	75	12	9	.	4	.	.	.	.	.	.	2	.
NH Rota, Spain	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Sigonella, Italy	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE WEST																		
NH Bremerton, WA	.	.	.	.	2	2	.	.	.	.	.	.	.	.	.	.	.	.
NH Camp Pendleton, CA	.	.	.	.	6	1	.	.	.	.	.	.	.	.	.	.	.	.
NH Guam-Agana, Guam	.	.	.	.	21	18	2	1	.	.	.	.	.	.	.	.	.	.
NHC Hawaii, HI	.	.	.	.	.	262	.	29	.	1	.	.	.	.	.	.	.	.
NH Lemoore, CA	.	.	.	.	22	.	.	1	.	.	.	.	.	.	.	.	.	.
NH Oak Harbor, WA	1	.	.	.	40	21	.	1	.	1	.	.	.	.	.	.	.	.
NH Okinawa, Japan	.	.	.	.	38	14	.	4	.	.	.	.	.	.	.	.	.	1
NMC San Diego, CA	.	.	3	1	232	194	36	28	6	3	.	.	3	1	2	.	2	.
NH Twentynine Palms, CA	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.
NH Yokosuka, Japan	1	.	.	.	23	21	.	1	.	1	.	.	.	.	.	.	.	.
NAVAL SHIPS																		
COMNAVAIRLANT/CINCLANTFLEET	.	.	.	.	17	10	.	1	.	.	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	.	.	.	.	19	16	2	1	.	.	.	.	.	.	.	.	.	.
OTHER LOCATIONS																		
Other	10	11	4	6	1,384	954	165	103	7	9	9	3	15	2	.	.	1	1
Total	**16**	**17**	**8**	**12**	**2,454**	**2,138**	**270**	**247**	**17**	**28**	**10**	**5**	**23**	**4**	**4**	**1**	**5**	**3**

Sentinel reportable events among service members and beneficiaries at U.S. Air Force medical facilities, cumulative numbers[a] for calendar years through 30 April 2009 and 30 April 2010

Air Force

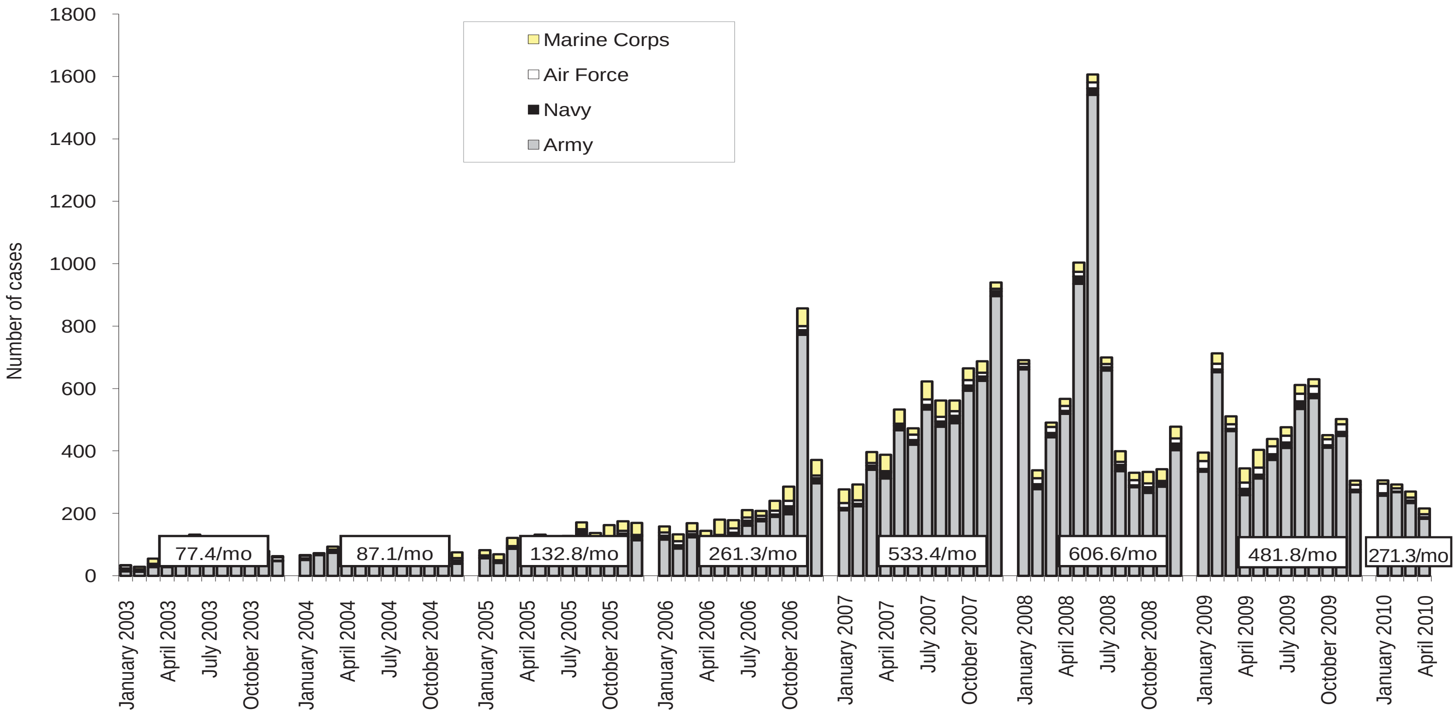
Reporting locations	Number of reports all events[b]		Food-borne						Vaccine preventable					
			Campylo-bacter		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella[c]	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Air Combat Cmd	492	529	1	2	4	2	1	.	.	1	1	7	2	2
Air Education & Training Cmd	501	475	3	.	9	1	1	1	1	2	3	7	.	.
Air Force Dist. of Washington	72	57	.	2	1	.	.	.	.	.	1	2	.	.
Air Force Materiel Cmd	178	170	.	2	2	2	.	.	.	.	.	.	.	.
Air Force Special Ops Cmd	64	62	1	.	.	1	.	1	.	.	.	1	.	.
Air Force Space Cmd	128	108	1	.	3	2	.	.	1	1	.	.	.	.
Air Mobility Cmd	298	204	2	2	3	1	2	.	.	1	4	2	1	.
Pacific Air Forces	191	297	.	.	1	2	.	2	.	.	4	1	2	1
U.S. Air Forces in Europe	196	196	2	1	.	1	.	.	.	.	3	.	.	2
U.S. Air Force Academy	23	25	.	.	1	1	.	.	.	.	.	2	.	.
Other	27	32	1	.	1	3	.	1	.	.	.	.	.	.
Total	**2,170**	**2,155**	**11**	**9**	**25**	**16**	**4**	**5**	**2**	**5**	**16**	**22**	**5**	**5**

[a]Events reported by May 8, 2010
[b]Sixty-seven medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, June 2009.
[c]Service member cases only.
Note: Completeness and timeliness of reporting vary by facility.

Reporting location	Arthropod-borne				Sexually transmitted						Environmental				Travel associated			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis		Cold[c]		Heat[c]		Q Fever		Tuberculosis	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Air Combat Cmd	3	1	.	.	437	450	37	58	1	3	5	3	.	.	.	.	.	.
Air Education & Training Cmd	.	.	.	2	432	419	45	41	3	1	3	.	1	.	.	.	.	1
Air Force Dist. of Washington	4	2	.	.	63	43	3	8	.	.	.	.	.	.	.	.	.	.
Air Force Materiel Cmd	3	.	.	.	154	148	17	18	2	.	.	.	.	.	.	.	.	.
Air Force Special Ops Cmd	1	.	.	.	58	54	2	3	1	1	1	1	.	.	.	.	.	.
Air Force Space Cmd	.	.	.	1	118	94	5	9	.	.	.	1	.	.	.	.	.	.
Air Mobility Cmd	6	4	.	1	237	176	27	15	2	1	14	1	.	.	.	.	.	.
Pacific Air Forces	.	.	.	1	156	269	17	19	2	1	9	.	.	.	.	.	.	1
U.S. Air Forces in Europe	2	1	1	1	173	171	12	18	1	.	1	.	.	.	.	.	1	1
U.S. Air Force Academy	.	.	.	.	21	22	1	.	.	.	.	.	.	.	.	.	.	.
Other	.	.	1	.	15	26	5	1	.	.	.	1	2	.	1	.	1	.
Total	**19**	**8**	**2**	**6**	**1,864**	**1,872**	**171**	**190**	**12**	**7**	**33**	**7**	**3**	**0**	**1**	**0**	**2**	**3**

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - April 2010 (data as of 28 May 2010)

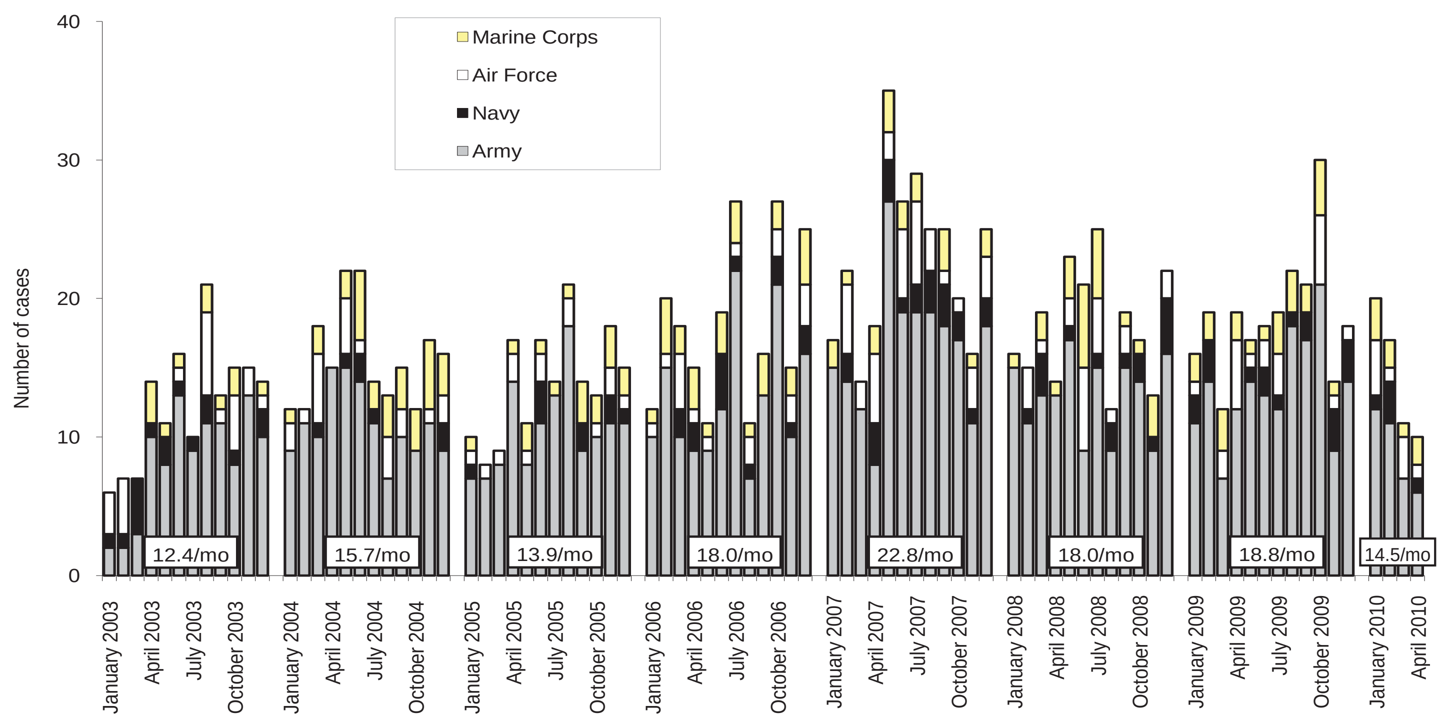
Traumatic brain injury (ICD-9: 310.2, 800-801, 803-804, 850-854, 907.0, 950.1-950.3, 959.01, V15.5_1-9, V15.5_A-F, V15.59_1-9, V15.59_A-F)[a]



Reference: Armed Forces Health Surveillance Center. Deriving case counts from medical encounter data: considerations when interpreting health surveillance reports. *MSMR*. Dec 2009; 16(12):2-8.

[a]Indicator diagnosis (one per individual) during a hospitalization or ambulatory visit while deployed to/within 30 days of returning from OEF/OIF. (Includes in-theater medical encounters from the Theater Medical Data Store [TMDS] and excludes 2,056 deployers who had at least one TBI-related medical encounter any time prior to OEF/OIF).

Deep vein thrombophlebitis/pulmonary embolus (ICD-9: 415.1, 451.1, 451.81, 451.83, 451.89, 453.2, 453.40 - 453.42 and 453.8)[b]

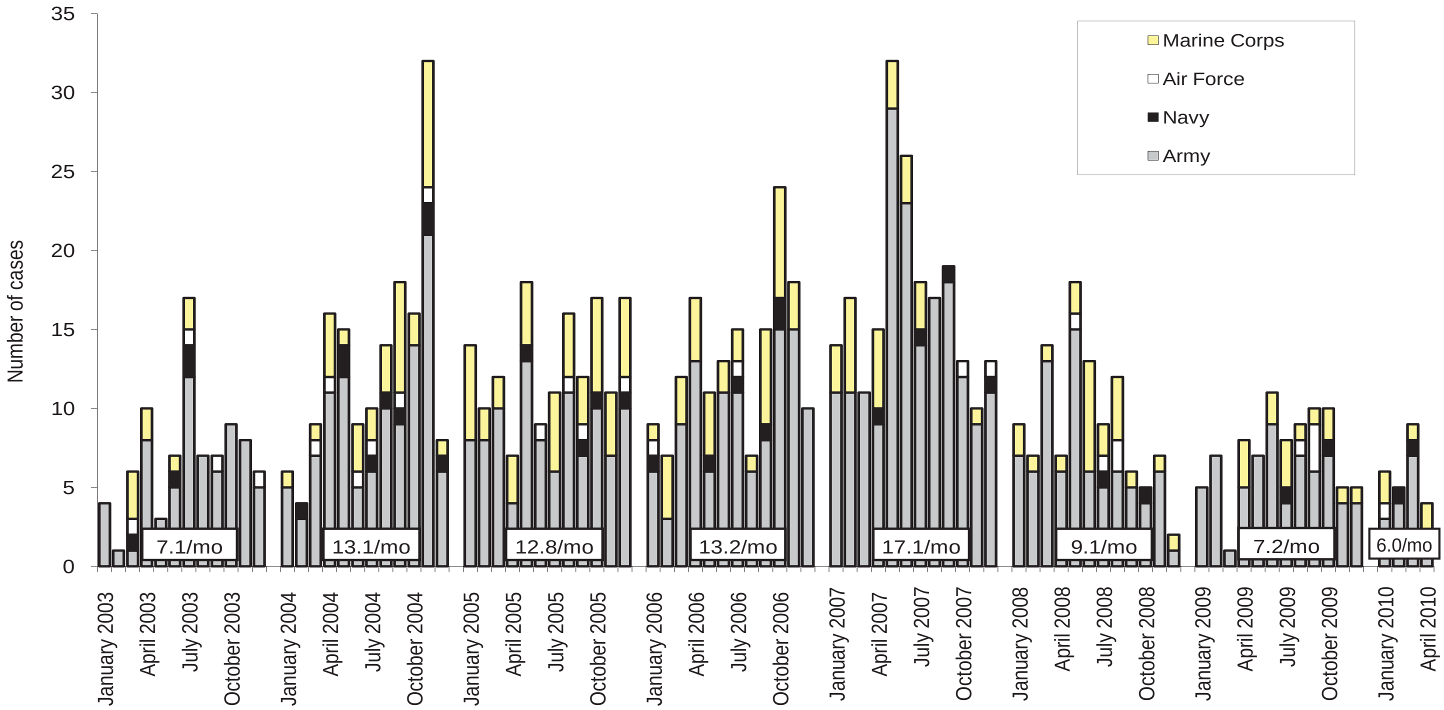


Reference: Isenbarger DW, Atwood JE, Scott PT, et al. Venous thromboembolism among United States soldiers deployed to Southwest Asia. *Thromb Res*. 2006;117(4):379-83.

[b]One diagnosis during a hospitalization or two or more ambulatory visits at least 7 days apart (one case per individual) while deployed to/within 90 days of returning from OEF/OIF.

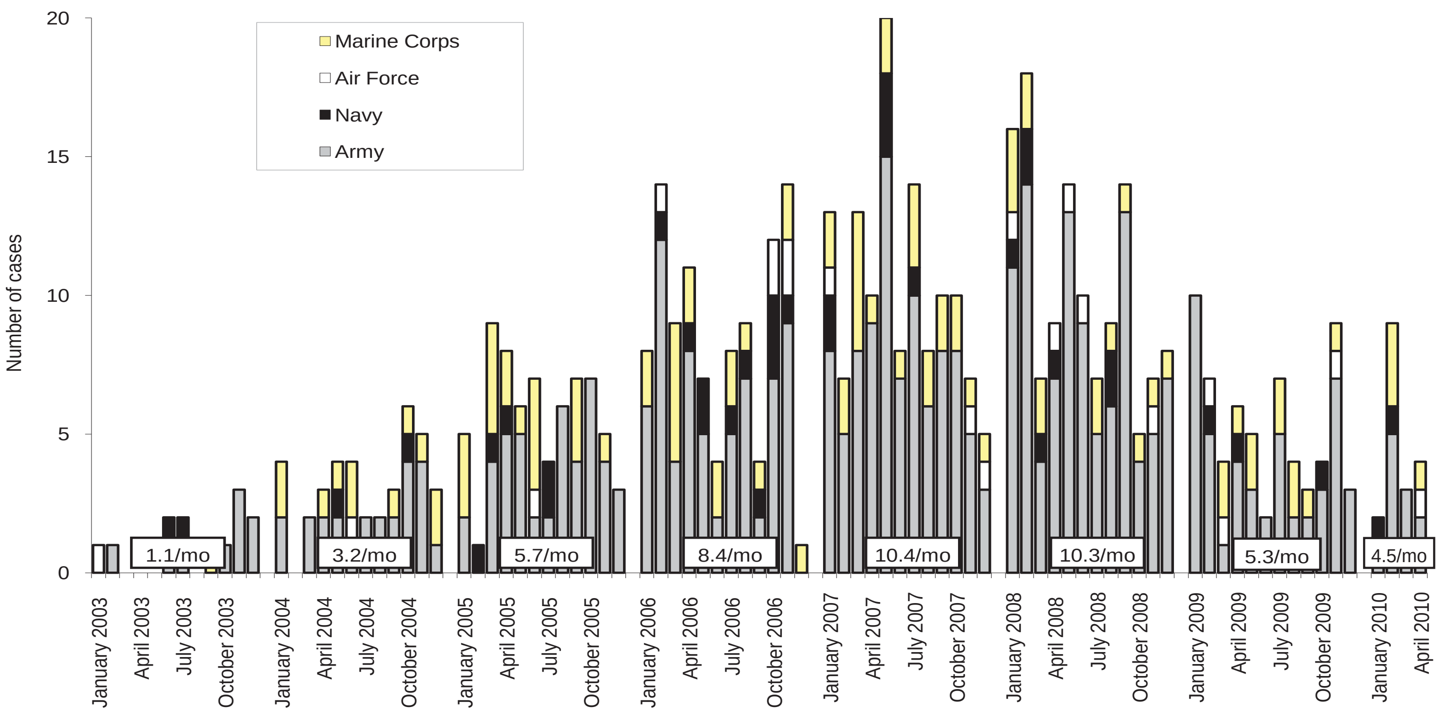
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - April 2010 (data as of 28 May 2010)

Amputations (ICD-9: 887, 896, 897, V49.6 except V49.61-V49.62, V49.7 except V49.71-V49.72, PR 84.0-PR 84.1, except PR 84.01-PR 84.02 and PR 84.11)[a]



Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: amputations. Amputations of lower and upper extremities, U.S. Armed Forces, 1990-2004. *MSMR*. Jan 2005;11(1):2-6.
[a]Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 365 days of returning from OEF/OIF.

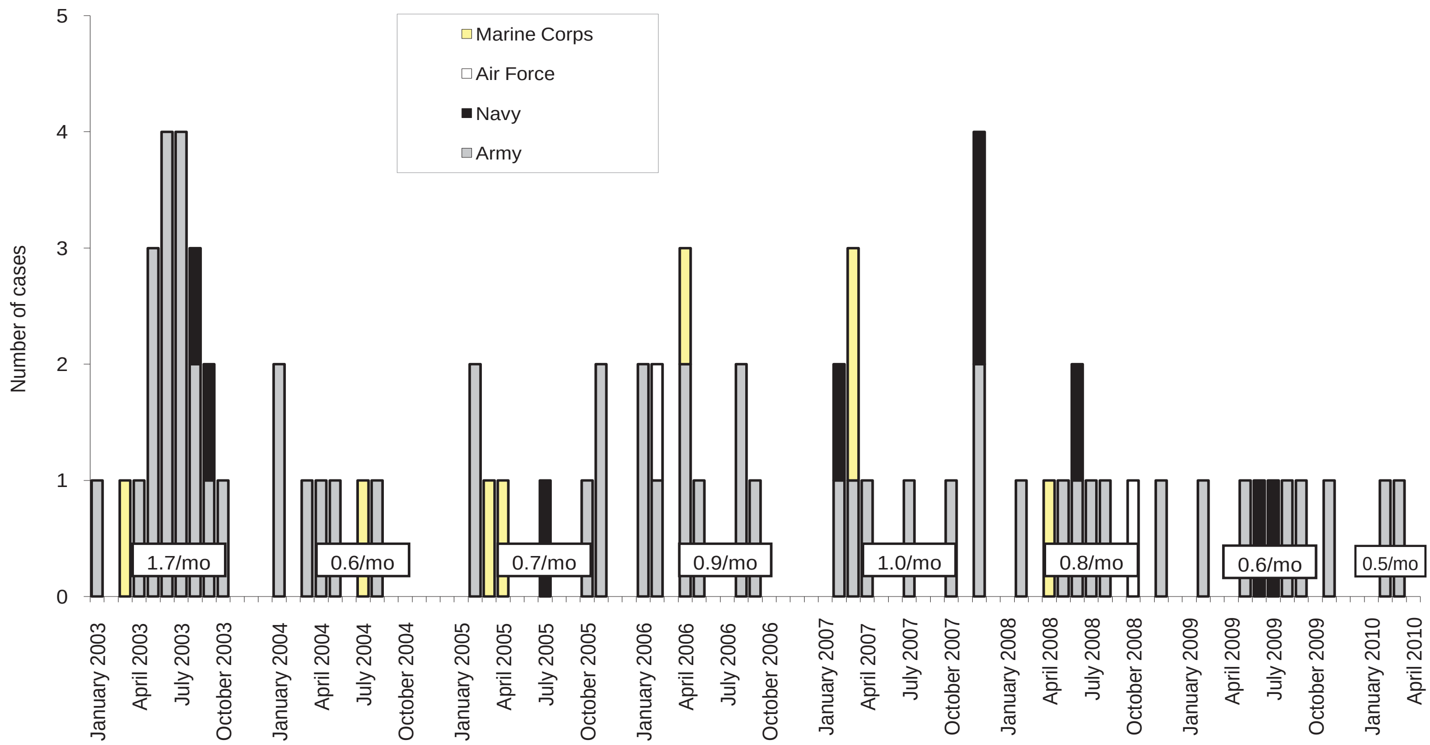
Heterotopic ossification (ICD-9: 728.12, 728.13, 728.19)[b]



Reference: Army Medical Surveillance Activity. Heterotopic ossification, active components, U.S. Armed Forces, 2002-2007. *MSMR*. Aug 2007; 14(5):7-9.
[b]One diagnosis during a hospitalization or two or more ambulatory visits at least 7 days apart (one case per individual) while deployed to/within 365 days of returning from OEF/OIF.

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - April 2010 (data as of 28 May 2010)

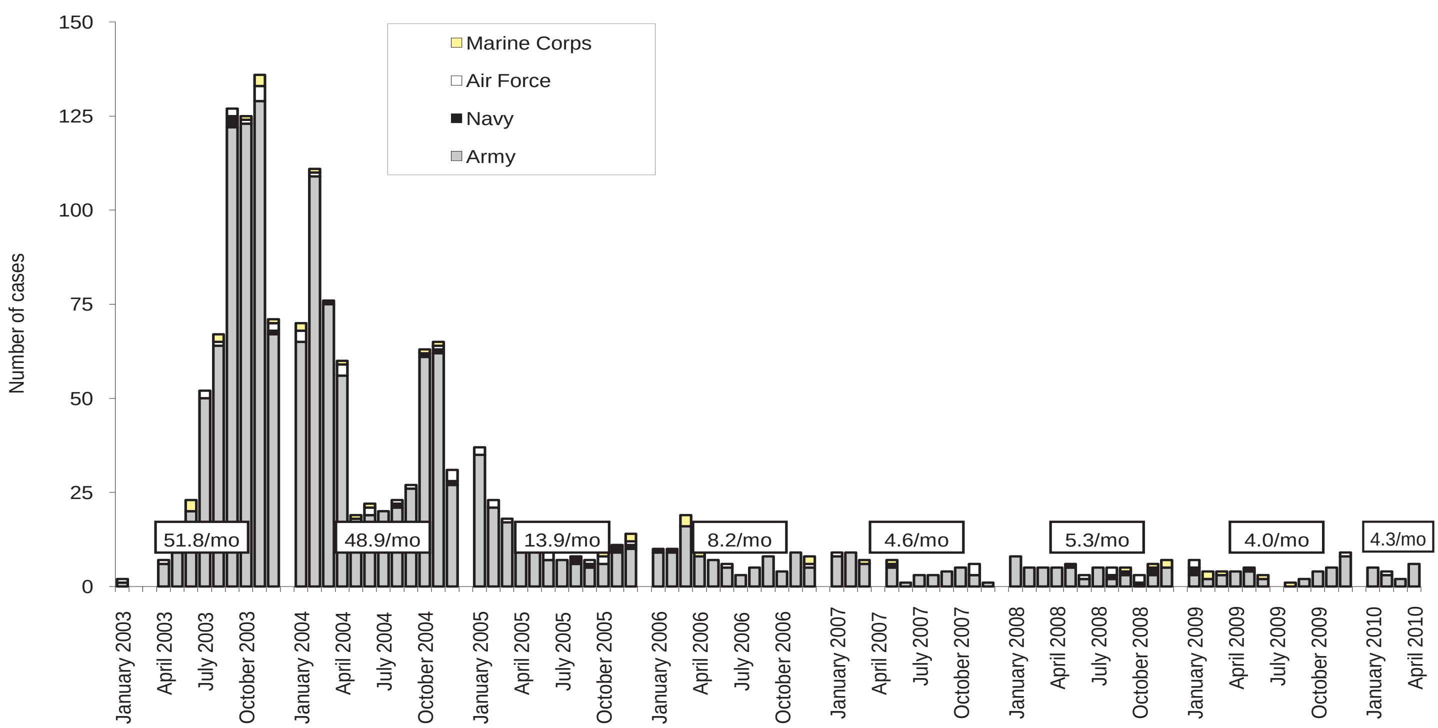
Severe acute pneumonia (ICD-9: 518.81, 518.82, 480-487, 786.09)[a]



Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: severe acute pneumonia. Hospitalizations for acute respiratory failure (ARF)/acute respiratory distress syndrome (ARDS) among participants in Operation Enduring Freedom/Operation Iraqi Freedom, active components, U.S. Armed Forces, January 2003-November 2004. *MSMR*. Nov/Dec 2004;10(6):6-7.

[a]Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 30 days of returning from OEF/OIF.

Leishmaniasis (ICD-9: 085.0 to 085.9)[b]



Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: leishmaniasis. Leishmaniasis among U.S. Armed Forces, January 2003-November 2004. *MSMR*. Nov/Dec 2004;10(6):2-4.

[b]Indicator diagnosis (one per individual) during a hospitalization, ambulatory visit, and/or from a notifiable medical event during/after service in OEF/OIF.

Commander
U.S. Army Public Health Command (Provisional)
ATTN: MCHB-TS-EDM
5158 Blackhawk Road
Aberdeen Proving Ground, MD 21010-5422

OFFICIAL BUSINESS

STANDARD
U.S. POSTAGE
PAID
APG, MD
PERMIT NO. 1

The Medical Surveillance Monthly Report (MSMR), in continuous publication since 1995, is produced by the Armed Forces Health Surveillance Center (AFHSC). The MSMR provides evidence-based estimates of the incidence, distribution, impact and trends of illness and injuries among United States military members and associated populations. Most reports in the MSMR are based on summaries of medical administrative data that are routinely provided to the AFHSC and integrated into the Defense Medical Surveillance System for health surveillance purposes.

All previous issues of the MSMR are available online at www.afhsc.mil. Subscriptions (electronic and hard copy) may be requested online at www.afhsc.mil/msmr or by contacting the Armed Forces Health Surveillance Center at (301) 319-3240. E-mail: msmr.afhsc@amedd.army.mil

Submissions: Suitable reports include surveillance summaries, outbreak reports and cases series. Prospective authors should contact the Editor at msmr.afhsc@amedd.army.mil